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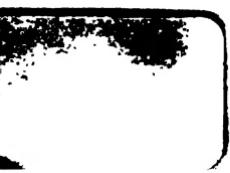
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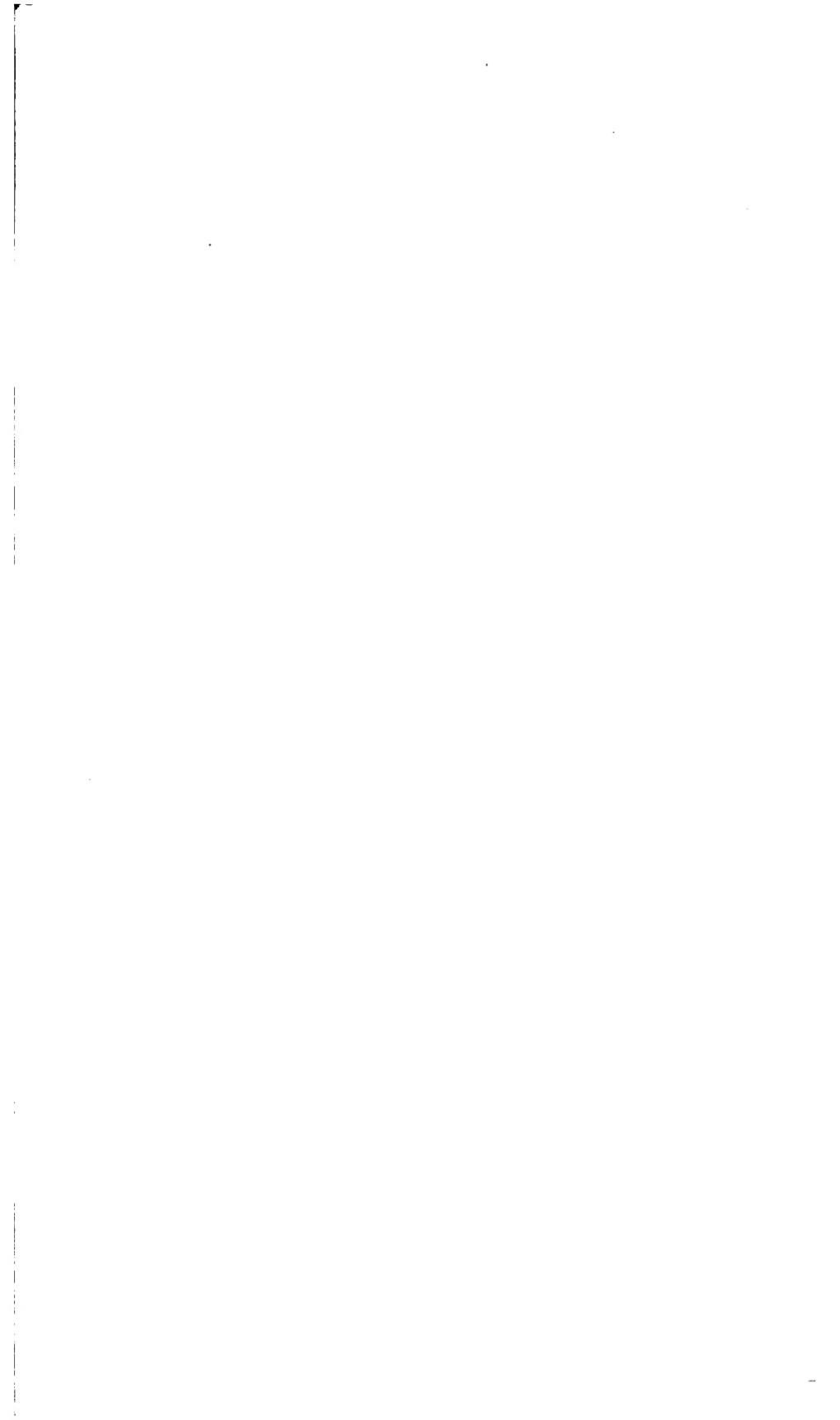
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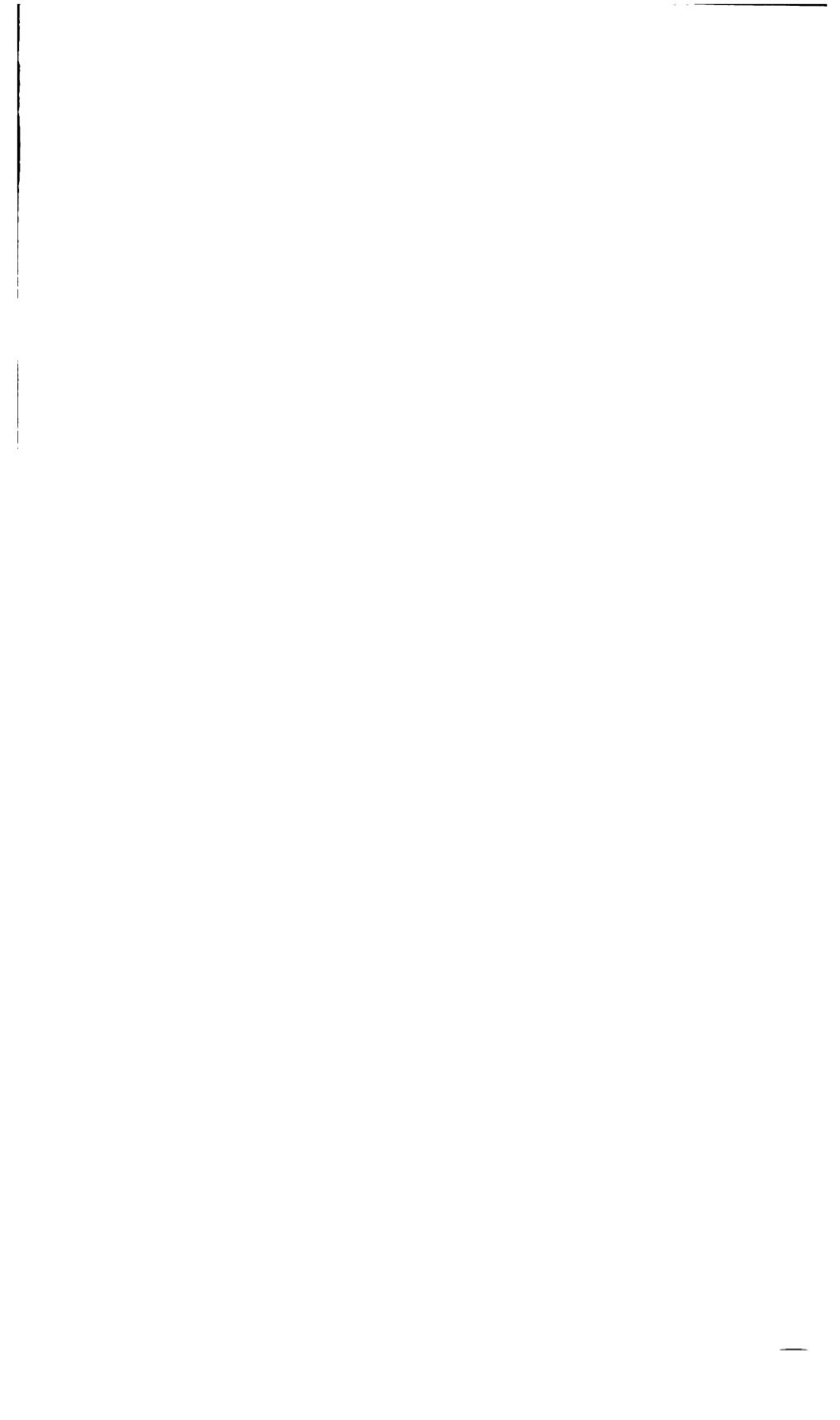
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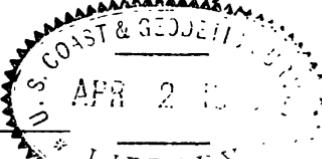
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Issue 5278

THE

AFRICA PILOT.

PART III.



SOUTH AND EAST COASTS OF AFRICA

LL

FROM THE

CAPE OF GOOD HOPE TO RAS ASIR (CAPE GUARDAFUI),

INCLUDING

THE COMORO ISLANDS.

ORIGINALLY COMPILED

BY CAPTAIN ALGERNON F. R. DE HORSEY, R.N.

FIFTH EDITION

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:

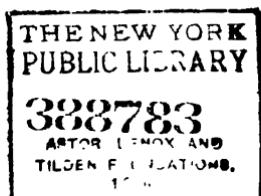
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ADVERTISEMENT TO THE FIFTH EDITION.

THE Fifth Edition of Africa Pilot, Part III., comprises Sailing Directions for the east coast of Africa, between the cape of Good Hope and Ras Asir (cape Guardafui), including the Comoro islands.

The surveys and directions for the coast between the cape of Good Hope and port Natal are by Captain Dayman, Commander Simpson, and Nav. Lieutenants Skead and Archdeacon, R.N., 1852-67. For the coast between cape St. Lucia and Delagoa bay, Zavora point to the Bazaruto islands, and the harbours of Chiluán, Innambán and Kilimán,—Captain P. Aldrich, H.M.S. *Sylvia*, 1884-85. For the coast between Ras Pekawi and Kiswere—Lieutenant Gray, H.M.S. *Nassau*, 1874-75. For the islands and channels of Mafia, Zanzibar, and Pemba; the coast from Songa Manara island to Pangani bay; and the harbours of Tanga, Lamu, Manda, and Kisimayu,—Commander Wharton, H.M. Ships *Shearwater* and *Fawn*, 1874-77. For Kilifi harbour,—Commander T. F. Pullen, H.M.S. *Stork*, 1888.

The description of the remaining portions of the coast is derived from the running surveys of the late Captains W. F. W. Owen and A. T. E. Vidal, R.N., 1823-25; from the observations of Captain de Horsey; the remark books of officers of H.M. Ships, and other documents in the Hydrographic Department, Admiralty.

The longitude of places given in the text of this work between the cape of Good Hope and Delagoa bay depend upon Cape observatory being in $18^{\circ} 28' 45''$ E. of Greenwich. The longitudes between Delagoa bay and Kisimayu (Refuge bay) depend upon Zanzibar (British Consulate) being in $39^{\circ} 11' 11''$ E. (By the latest determination, the Cape observatory is considered to be in long. $18^{\circ} 28' 40''$ E., and Zanzibar in long. $39^{\circ} 11' 8''$ E., but as these are not final, places dependent on them have not been altered). Between Kisimayu and cape Guardafui the longitudes depend upon Aden (local telegraph office) being in $44^{\circ} 59' 7''$ E. of Greenwich.

The first edition of this work compiled by Captain A. F. R. De Horsey, was published in 1864. The second edition in 1865. The third edition was revised by Commander J. Penn in 1878. The fourth edition with an appendix was published in 1884.

The present edition has been revised by Staff Commander C. H. C. Langdon, R.N., of the Hydrographic Department.

Officers of the Royal and Mercantile Marine are requested to transmit to the Secretary of the Admiralty any notices of errors or omissions they may discover, as well as any fresh information they may obtain, in order that this work may be improved for the general benefit of the navigator.

By the publication of this work, all Hydrographic Notices relating to former editions and all Notices to Mariners, inclusive of No. 112 of 1889, are cancelled.

W. J. L. W.

Hydrographic Office, Admiralty, London,
April, 1889.



SYSTEM OF ORTHOGRAPHY.

AS far as has been found possible with existing knowledge the native names in this book are spelt in accordance with the following system, which will be gradually introduced into all Admiralty Sailing Directions.

1. Where native names have been so long written in a form, which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained, and no European names are changed from the correct orthography.

2. The true sound of the word as locally pronounced is taken as the basis of the spelling.

3. An approximation of the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.

4. The broad features of the system adopted are that vowels are pronounced as in Italian and consonants as in English, *every letter being pronounced*. One accent only is used, the acute, to denote the syllable on which stress is laid. This is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."

5. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai*, *au*, *ei*.

The amplification of the rules is given below.

Information as to the proper spelling of native names, so as to produce the nearest approximation to the true sound, by this system, is invited.

| Letters. | Pronunciation and Remarks. | Examples. |
|-----------|---|---|
| <i>a</i> | <i>ah, a</i> as in <i>father</i> | Java, Banána, Somáli, Bari. |
| <i>e</i> | <i>eh, e</i> as in <i>benefit</i> | Tel-el-Kebír, |
| <i>i</i> | English <i>e</i> ; <i>i</i> as in <i>ravine</i> ; the sound of <i>ee</i> in <i>beet</i> . | Oléleh, Yezo, Levúka, Peru. |
| <i>o</i> | <i>o</i> as in <i>mote</i> | Fiji, Hindi. |
| <i>u</i> | long <i>u</i> as in <i>flute</i> ; the sound of <i>oo</i> in <i>boot</i> . | Tokio. |
| | oo or ou should never be employed for this sound. Thus, not <i>Zooloo</i> or <i>Zoulou</i> , but All vowels are shortened in sound by doubling the following consonant. | Zulu, Sumatra. Yarra, Tanna, Mecca, Jidda, Bonny.* |
| | Doubling of a vowel is only necessary where there is a distinct repetition of the single sound. | Nuulúa. |
| <i>ai</i> | English <i>i</i> as in <i>ice</i> | Shanghai. |
| <i>au</i> | <i>ow</i> as in <i>how</i> - thus, not <i>Foochow</i> , but | Fuchau. |
| <i>ao</i> | is slightly different from <i>au</i> | Macao. |
| <i>ei</i> | is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from <i>ey</i> in the English <i>they</i> . | Beirút, Beilul. |

* The *y* is retained as a terminal in this word under rule 1 above. The word is given as a familiar example of the alteration in sound caused by the second consonant.

| Letters. | Pronunciation and Remarks. | Examples. | | | | |
|----------|--|------------------|---|----------------------|-----------------------------|---------|
| b | English <i>b</i> . is always soft, but is so nearly the sound of <i>s</i> that it should be seldom used. | Celébes. | | | | |
| c | If <i>Celébes</i> were not already recognised it would be written <i>Selébes</i> . | | | | | |
| ch | is always soft as in <i>church</i> - - - | Chingchin. | | | | |
| d | English <i>d</i> . | | | | | |
| f | English <i>f</i> . <i>Ph</i> should not be used for the sound of <i>f</i> . | Haifong, Nafa. | | | | |
| g | Thus, not <i>Haiphong</i> , but is always hard. (Soft <i>g</i> is given by <i>j</i>) - | Galápagos. | | | | |
| h | is always pronounced when used. | | | | | |
| j | English <i>j</i> . <i>Dj</i> should never be put for this sound. | Japan, Jinchuen. | | | | |
| k | English <i>k</i> . It should always be put for the hard <i>c</i> , - - thus, not <i>Corea</i> , but | Korea. | | | | |
| kh | The Arabic guttural - - - | Khan. | | | | |
| gh | is another guttural, as in the Turkish - - | Dagh, Ghazi. | | | | |
| l | | | | | | |
| m | | | | | | |
| n | | | | | | |
| ng | has two separate sounds, the one hard as in the English word <i>finger</i> , the other as in <i>singer</i> . As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them. | p | As in English. | ph | As in <i>loophole</i> - - - | Mokpho, |
| th | Stands both for its sound in <i>thing</i> , and as in <i>this</i> . The former is most common - | Chemulpho. | | | | |
| q | should never be employed; the sound of <i>qu</i> in <i>quiver</i> is given as <i>kw</i> . When <i>qu</i> has the sound of <i>k</i> , as in <i>quit</i> , it should be given by <i>k</i> . | Bethlehem. | | | | |
| r | | | | | | |
| s | | | | | | |
| t | | | | | | |
| v | | | | | | |
| w | | | | | | |
| x | | | | | | |
| y | is always a consonant, as in <i>yard</i> , and therefore should never be used as a terminal, <i>i</i> or <i>e</i> being substituted | z | Thus not <i>Mikindány</i> but nor <i>Kwaly</i> but English <i>z</i> - - - | Mikindáni. Kwale. | | |
| z | Accents should not generally be used, but where there is a very decided emphatic syllable or stress which affects the sound of the word, it should be marked by an acute accent - - - | Zulu. | | | | |
| z | | | | | | |

NOTE.—With reference to the last clause of Rule 1 :—In this volume the Dutch names in the Cape Colony are retained as written by the Dutch, but native names rendered by the Dutch or Portuguese after their own orthographic systems are given in accordance with the one here adopted. Thus, the Portuguese form *Quilwa* is spelt *Kilwa*.

GLOSSARY OF A FEW NATIVE GEOGRAPHICAL TERMS OCCUR-
RING IN THE CHARTS AND SAILING DIRECTIONS, BETWEEN
MOZAMBIQUE AND RAS ASIR.

| Name. | Signification. |
|------------------|----------------------------------|
| Chombo ; Jombo | Dhow ; very large dhow. |
| Fungu | Bank or sandy reef. |
| Geneza, Ngome | Castle. |
| Bandari, Bundari | Harbour. |
| Khari | Creek. |
| Khor | Salt water inlet, usually tidal. |
| Kilele | Peak. |
| Kilíma | Hill. |
| Kisiwa | Island. |
| Masíka | Rainy season. |
| Mlango | Channel. |
| Mlima | Mountain. |
| Mto | River, inlet or creek. |
| Mwamba | Reef (rocky). |
| Pwani | Coast. |
| Ras | Cape or point. |

NAMES OF DIFFERENT KINDS OF DHOWS MET WITH.

| | | | |
|--------|---|---|---|
| Bágala | - | - | Large dhows with very high square sterns, tall poops, and long projecting prows. |
| Bedéni | - | - | A dhow with a sharp stern, high rudder-head, and a perpendicular cutwater. |
| Bétela | - | - | The common dhow of Zanzibar ; it has a square stern, with a low poop. |
| Dau | - | - | A small open vessel, sharp at the stern, with a square matting sail. |
| Mtépe | - | - | A large open vessel, sharp at the stern, with a large square matting sail ; the prow is made to resemble a camel's head. These belong generally to the neighbourhood of Lamu. |

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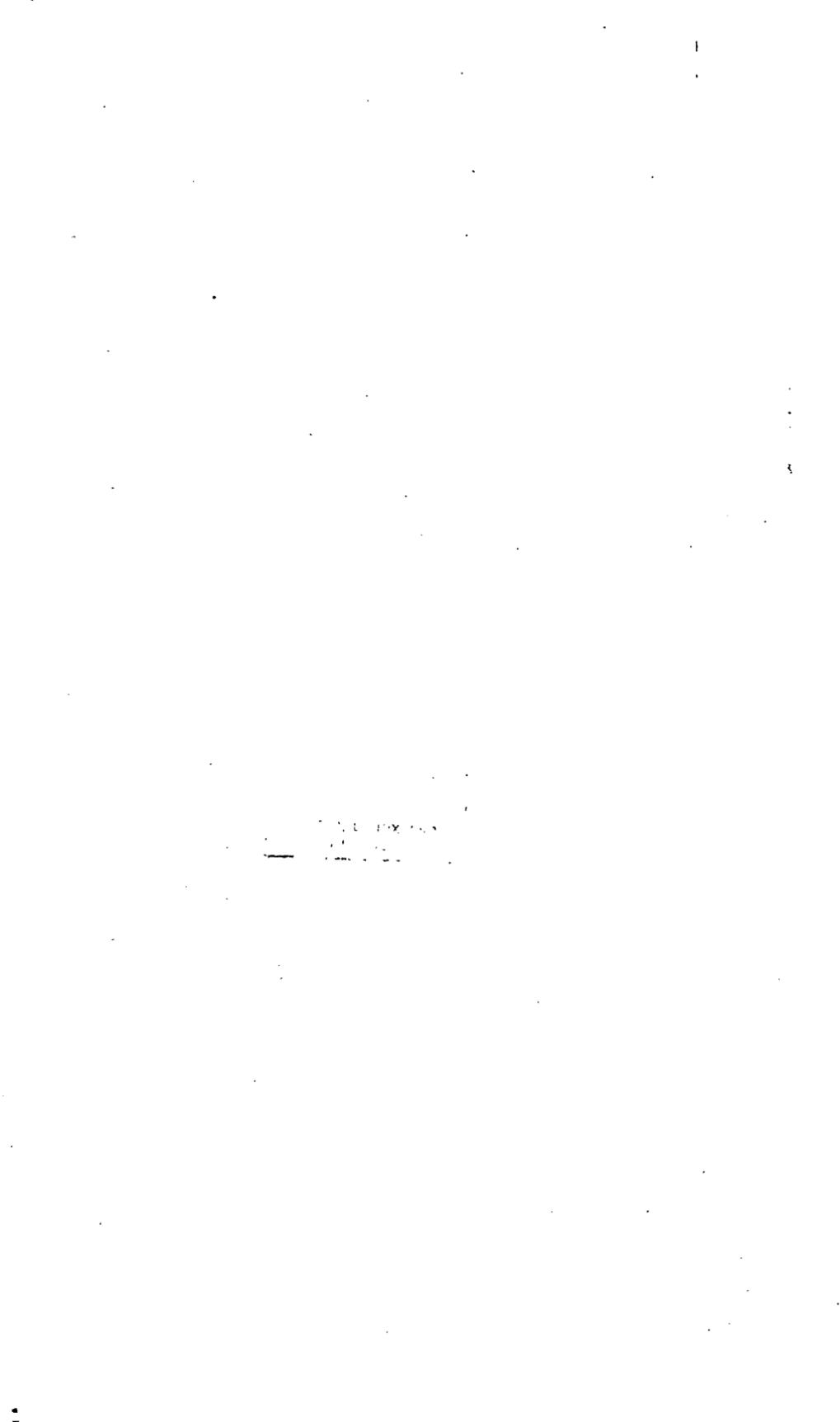
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**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC
EXCEPT WHERE MARKED AS TRUE.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO
100 FATHOMS.**

**THE SOUNDINGS ARE REDUCED TO LOW WATER OF
ORDINARY SPRING TIDES.**



THE AFRICA PILOT.

PART III.

CHAPTER I.

**GENERAL REMARKS ON THE SOUTH AND EAST COASTS OF AFRICA.—
COMMUNICATIONS.—COAL.—DOCKS.—WINDS AND WEATHER.—
CYCLONES.—BAROMETER.—TEMPERATURE.—ICEBERGS.—CLIMATE.—
CURRENTS.—PASSAGES.**

For later information respecting the lights which are described in this work, seamen should consult the Admiralty List of Lights in South Africa, East Indies, &c. This Light List is published early in the current year, corrected to the preceding 31st December.

... by the Orange river, and on the east by the colony of Natal; its area is about 225,000 square miles.

The country directly south of the Orange river consists of a series of terraces divided by mountain ranges varying in height from 4,000 to 8,000 feet, and rising gradually from south to north as far as the parallel of 32° S., whence it gradually declines in a series of open sterile plains to the river itself; the culminating point is the Spitzkoss or Compass Berg, 8,500 feet above the sea level; the passages

from one plateau to another are by well made passes through the narrow and difficult gorges or Kloofs. One of these plateaus is known as the great Karroo, 300 miles in length, east and west, with a breadth of 70 miles. Where streams exist the wondrous fertility of this plain is apparent, as also it is immediately after thunderstorms, when the whole area is covered by a profuse and varied vegetation. The rivers, though numerous, are practically useless either for navigation or irrigation ; most of them flow in deep and precipitous ravines, and except when swollen by the rains are mere shallow torrents ; even the largest of them have bars at their mouths, which render in most cases entrance to them both difficult and dangerous ; but much has been done in recent years to render some of the bars navigable.

The cape of Good Hope was discovered in 1486, by Bartholomew Diaz, who named it Cabo Tormentoso, or Stormy cape ; but King John II. of Portugal, convinced of its being the turning point of the long-desired route to India, gave the name of Boa Esperança, or cape of Good Hope ; his convictions were confirmed eleven years after, by Vasco de Gama, who then rounded the cape. In 1620, two English East India commanders, by a proclamation dated from Saldanha bay, took possession of the cape in the name of Great Britain ; but no settlement was formed.

In the year 1652 the territory was colonized by the Dutch East India company, under Van Riebeck, and continued in their possession until 1795, when the British government took possession, but at the peace of Amiens in 1802, the colony was ceded to its former possessors. In 1806 it was again taken by the English ; confirmed at the general peace in 1815, and has since continued a British colony.

Cape Town, the capital of the colony, and the seat of government stands on the western shore of Table bay, between it and the foot of Table mountain, and is well laid out, with numerous public buildings schools, hospitals, churches, and several good squares ; it has a population of 40,000. Cape Town is connected with the principal places in the colony by railway.

The Population of the Cape Colony, in 1881, was estimated to be 811,450 ; and with its dependencies to nearly 1,400,000. This includes 290,000 Europeans or whites, 11,000 Malays, 99,000 Hottentots, 86,500 Fingoes, 121,000 Griquas, and 792,000 Kafirs and Bechuanas ; about five or six individuals to each square mile of territory. In 1885 the total, including probably the recently annexed territory, was 1,663,000.

Products.—Generally speaking, the eastern and southern portions of Cape Colony receive an abundant water supply, are well wooded and extremely fertile.

The colonists are chiefly employed in the production of wool and wine; in the rearing of horses, cattle, sheep, and ostriches, and the culture of wheat, barley, oats, and maize. The waters around the coast abound in fish. The colony is rich in minerals, principally coal, copper, diamonds and manganese. The present annual produce of coal is about 25,000 tons; diamonds are the most valuable of the exports, chiefly found in the district of Kimberley, of which the declared value in 1886 was £3,504,756; the value of wool is about one half that of the diamonds.

Total exports of the colony in 1886 amounted to £7,125,356.

| | | | | |
|---------------|---|---|---|-------------|
| Total imports | " | " | " | £3,799,261. |
|---------------|---|---|---|-------------|

The external trade is considerable, and chiefly carried on in British and colonial vessels, as is shown by the tonnage for the year 1886. Inwards—British and Colonial, 2,636,852; foreign, 85,893. Outwards British and Colonial, 2,641,967; foreign, 82,415.

Ports in Cape Colony.—The Cape Colony is destitute of natural harbours or sheltered anchorages for large vessels, with the exception of Saldanha bay on the west coast, and Simons bay, and to supply this deficiency large sums of money, amounting in the aggregate to over two millions, have been spent in executing protective works; the breakwater and docks at Cape Town being the most important. Being exposed to the swell of the Southern Ocean, the sea breaks heavily on the whole of the iron-bound coast of the Cape Colony, particularly during on-shore winds, and a vessel touching on any part of it has not the slightest chance of escaping destruction. Landing, consequently, is difficult, and at times dangerous, even from the anchorages.

The principal ports and anchorages are: Table bay anchorage and docks, affording limited accommodation for vessels up to 24 feet draught; Simons bay, the naval establishment, with shelter for all classes of vessels; and port Elizabeth which is said to be secure at all times, if provided with good ground tackle, but the south-east summer gales are dangerous; other seaports and anchorages are:—Mossel bay; Knysna; Plettenberg bay; port Alfred; East London; and St. John river; several of these are situated in the mouths of rivers with shallow bars across the entrances, and are not available during stormy weather as the bars then usually break. Vessels at anchor in the roads off these places have sometimes to proceed to sea on the approach of a gale; information is usually given from the Port S.O. 10625.

Office, which receives a weather report daily from Cape Town. See page 13. During the heavy westerly gales of winter, secure anchorage will be found in Mossel, Plettenberg, and Algoa bays, by vessels working westward round the Cape of Good Hope. Fuller information is given with the description of each port.

NATAL.—The Colony of Natal derives its name from the fact of its discovery by the celebrated Portuguese navigator, Vasco de Gama, on Christmas Day, 1497. In 1837, the Governor of the Cape took military possession of the district, and in 1843 the district of Natal was proclaimed a British Colony. In 1856 it was erected into a distinct and separate colony, free from the control of the Governor of the Cape. It comprises an area of about 19,000 square miles. The scenery in Natal is in many parts picturesque in the extreme ; it is well watered, no less than 23 distinct rivers running through it, but none are navigable. Like the Cape Colony, landing is extremely difficult, and dangerous at times, on the coast of Natal, and as far north-eastward as Delagoa bay. It has only one harbour, Durban or Port Natal, which is completely landlocked, but the bar prevents vessels above 15 to 16 feet draught from entering, even under favourable circumstances, but extensive works are in progress for deepening the bar and harbour, which in course of time it is hoped will render it available for large ocean-going vessels. Pietermaritzburg, the capital and seat of government, with a population, 14,429, is situated about 50 miles inland from Port Natal, with which it is connected by a railway 70 miles in length. The population of the colony, 1884, was estimated at 424,495 ; consisting of Europeans, 35,453 ; Zulu-Kafirs, 361,766 ; Indian coolies, 27,276.

Products.—The coast region, extending about 15 miles inland, is highly fertile, and has a climate almost tropical, though perfectly healthy. Sugar, coffee, indigo, arrowroot, ginger, tobacco, rice, pepper and cotton thrive amazingly ; the midland district is more adapted for cereals and other European crops, while the upper district is chiefly grazing land, and sheep farming is the principal occupation of the inhabitants. Horses and cattle are also reared in large numbers. The chief mineral products are coal and lime. The railway from Ladysmith to the coal mines, 18 miles in length, is completed, thus bringing them in connection with Port Natal. Large forests of valuable timber abound in the kloofs of the mountain ranges, and many tracts of the coast are also well wooded.

Exports.—The chief exports are wool, sugar, ivory, hides, maize, angora hair, and ostrich feathers, and the total value for the year 1886

amounted to £960,000, about one half of which was for wool alone. Imports :—£1,330,000.

MOZAMBIQUE.—The province of Mozambique is a strip of the coast lying between Delagoa bay, northward to near cape Delgado, a distance of about 1,400 miles. Though the Portuguese claim this territory, a few isolated points only are occupied by them. The province is divided into nine districts, viz :—Delagoa bay, Innambán, Sofala, Tete and Sena on the Zambesi, Kilimán, Angoche, Mozambique and cape Delgado or Kwerimba, the latter includes the Kwerimba islands, 28 in number, of which 4 only are inhabited, Ibo being the principal.

The Portuguese arrived in these parts in 1497, and took possession of the coast, which was famed for its gold, from the Arabs. In 1508 they built a fort at Mozambique port, and the town which grew up around it was made the capital of the province in 1813. The governor of Mozambique is the supreme authority, assisted by a council and a small military force, chiefly composed of Portuguese convicts. The number of whites, Arabs, and Banyans at the several stations is inconsiderable.

The Zambesi and Limpopo are the principal rivers, of which a full account will be found in the description of the coast.

Products.—Considerable portions of the coast are cultivated and yield abundant rice harvests, the forests yield timber, and the elephants and hippopotami furnish the ivory of the coast trade. There are gold washings in some districts. Sofala, from its richness in gold, has been supposed by some to be the golden Ophir to which King Solomon sent his ships once in three years. From the gold fields of Manica, about 130 miles westward of Sofala, Livingstone is reported to have seen gold as large as grains of wheat.

Exports.—The principal exports are ground nuts, india-rubber, beeswax, ivory, and an inferior kind of gum-copal.

Harbours.—The principal trading ports, beginning from the southward, are :—Delagoa bay, Innambán, Chiluán, Kongoni mouth of the Zambesi, Kilimán, Angoche, Mozambique, and Ibo. Delagoa bay, with its fine harbour, will probably, when the railway now opened to the Transvaal boundary is extended into that country, become a port of considerable importance.

Landing, like in the Cape Colony and Natal, is difficult and dangerous on the coast of the southern part of the province of Mozambique, and in many places impracticable, but farther northward the coast is more broken up into bays, and fronted in places by islands or reefs, which afford protection to leeward of them.

ZANZIBAR COAST.—From the neighbourhood of cape Delgado, to Kipini village in Formosa bay (lat. $2^{\circ} 35' S.$), for a distance of about 10 miles inland the coast is under the sovereignty of the Sultan of Zanzibar. The important islands of Zanzibar, Mafia, and Pemba, the islands of Lamu, Manda and Patta, and the ports of Kisimayu, Brava, Muerka, Magadoxa, and Warsheikh in Somali land, near the equator, also form part of his territories. The country westward of the Zanzibar coast, from Rovuma river, near cape Delgado, as far north as lat. $4^{\circ} 30' S.$, is under German influence; thence northward to Tana river in Formosa bay, and extending northwestward to Victoria Nyanza lake is under British influence.* Northward of the Tana river is Somali country.

The principal places on the Zanzibar coast are, from the southward, Kilwa Kisiwani, Kilwa Kivinje, Dar-es-Salaam, Bagamoyo, Pangani, Mombasa, Lamu, and Magadoxa. Unguja or Zanzibar, the capital, on Zanzibar island, is the principal town, and the only port regularly visited by ocean-going steamers. Bagamoyo, on the mainland opposite Zanzibar, is the chief point of departure and arrival of the caravans which pass inland to Unyanyembe and the lake regions by one or other of several parallel routes, and carries on a brisk ivory trade.

The Rovuma, Rufiji, Ruvu or Kingani, Pangani, Tana, and the Juba are the principal rivers on this coast, but are scarcely navigable by anything larger than a steam launch.

Products.—Most of the produce of the mainland is brought to Zanzibar town in dhows for re-shipment. The whole country is capable of producing an unlimited quantity of cloves, sugar, coffee, nutmegs, cinnamon, pepper, sesame, indigo, cotton, coco-nuts, and copal gum, and the ivory trade remains an important branch of traffic. The principal district for gum-copal is inland from Dar-es-Salaam. Almost the whole of the coast trade is in the hands of Banyans, but there are several European establishments at Zanzibar.

Harbours.—The Zanzibar coast has numerous harbours and anchorages, many of which may be entered by large vessels. Zanzibar, as before stated, is the principal. Kilwa Kisiwani and Kivinji in the south, and Mombasa, Lamu, and Kisimayu in the north, are perhaps next in importance.

Landing may generally be effected from most of the anchorages, but at certain points of the coast exposed to the ocean, landing is at times difficult. Northward of Pemba, with on-shore winds, it is at

* These boundaries are not absolute, but are merely given to afford the mariner some knowledge of the various claims to the country.

times dangerous. In many places the coast is fronted by islands and detached reefs, which afford smooth water to leeward of them.

SOMALI LAND is in the form of a triangle, with its apex at Ras Asir. Its western boundary begins at the head of the gulf of Tajura, in the gulf of Aden, passes eastward of Harar, follows the Haines river for some distance, and then crosses over to the Juba, which anciently formed the limit down to the coast. Within the last twenty-five years, however, the Somalis have crossed that river, driving the Gallas before them, and are at the present time the masters as far as the Tana river, in Formosa bay ; on the coast various tribes of negroes are in possession (*see* foot note, p. 6). As before stated, the Sultan of Zanzibar has most of the sea ports as far as Warsheik, which is 450 miles northward of the Tana. Northward of Ras-al-Khyle, the numerous clans of the Mijjertheyn Somalis occupy the coast as far as Bander Zaida, in the gulf of Aden.

As far as is known, the whole of the Somali country has a gradual slope from the heights which border the gulf of Aden, south-eastward towards the Indian ocean. With the exception of the Juba, there appears to be but one permanently flowing stream, namely the Haines or Doho, locally known as the Wobbi (meaning river). Some of its tributaries flow past Harar, others from the more eastern mountain range, the highlands of Gurage. This river flows through the Ogaden country, a famous pastoral region, where the Somali have large herds of camels, ponies, cows, and sheep, and where gazelles and antelopes roam about in vast herds. Numerous agricultural settlements extend along this river. Near Magadoxa the river approaches the coast, and, running parallel with it, terminates inland of Brava in a marsh, which, after rain, expands into a considerable lake. The Haines river has a rapid current at times, but to a steam launch (which would have to be taken there in sections) its navigation appears to present no difficulty as high up as the town of Imi.

The Juba has been traced as a navigable stream as far as Bardera, about 120 miles in a direct line from the coast, but it undoubtedly rises far inland.

The coast from the equator nearly to Ras Aswad is principally composed of low hills, some covered with stunted bushes, but becoming bare to the northward ; with the exception of the high land between Ras Aswad and Ras Awath, the coast is low, rocky, and sterile, with sand hills in places, as far as Ras Hafun ; very little is known of it.

Products.—Hides, orchilla weed and oil seeds, with a little ivory and some ostrich feathers from the interior, are the principal pro-

ducts ; these are exchanged for sugar, dates, salt fish, and arms, brought by the dhows in the north-east monsoon period from Arabia.

Harbours.—This eastern coast of Somali land possesses no harbours of any importance ; the anchorages at Magadoxa and Brava afford protection within the reefs for dhows only ; these, moreover, are Zanzibar territory. Kisimayu or Refuge bay, also Zanzibar territory, in lat. $0^{\circ} 23'$ S., is the most northern harbour for large vessels on this coast. There is thus a stretch of sterile coast 800 miles in length without shelter, as far north as Ras Hafun peninsula, under which there is shelter on either side, depending on the prevailing monsoon.

COMMUNICATION.—There are about 1,650 miles of railway open in the Cape Colony, extending eastward from Cape Town to the Kimberley gold mines, with branches to port Elizabeth, port Alfred, and East London ; the latter is also in connection with Aliwal North. The colony of Natal is not in connection with this railway system, but from port Natal a line runs through Pietermaritzberg, the capital, to Ladysmith, and to the coal mines beyond.

Telegraph.—The principal towns in Cape Colony, Natal, and the Transvaal are connected by the electric telegraph ; Cape Agulhas and St. Francis lighthouses are also in connection with the system.

Submarine Cables.—From Natal a submarine telegraph cable is laid to Aden, *via* Delagoa bay, Mozambique and Zanzibar. Submarine telegraph communication has recently been completed between the Cape and St. Paul de Loanda, *via* port Nolloth, Mossamedes, and Benguela. Loanda is in connection with Europe, *via* the Gold Coast ports.

Mails.—There is weekly mail communication between England, Cape Town, the principal seaports of the Cape Colony and Natal ; the passage from England to the Cape occupying from 18 to 20 days; also constant communication between the ports of Cape Colony.

There is also monthly mail communication between the Cape Colony and Delagoa bay, Innambán, Chiluán, Kilimán, Mozambique, Ibo, and Zanzibar, from whence there is a mail steamer to Aden, &c. The steamer returning to the Cape from Zanzibar calls at the same ports.

The Messageries Maritime (French) line of steamers to Reunion, Madagascar, &c., call at Zanzibar and Mayotta monthly.

COAL may be obtained at the following places in South and East Africa :—Cape Town ; Simons Town ; Mossel bay, small quantity ; Port Elizabeth ; Port Alfred, possibly a small quantity ; East London,

Natal, Delagoa bay, small quantity; Mozambique and Zanzibar. Details of coaling are given with the description of the ports.

DOCK ACCOMMODATION.—Cape Town is the only place included in this work provided with a dock suitable for large vessels.

This dock has a depth of 26 feet on the sill at high water ordinary springs. There is also a patent slip capable of taking vessels of 1,000 burthen. The patent slip at Simons Town will take up vessels of 1,000 tons, lightened to 14 feet. The patent slip at Natal will take up vessels of 500 tons burthen. For details, see the ports referred to.

PILOTS.—The statement in certain places in this work that the employment of pilots is compulsory, does not apply to H.M. ships of war.

WINDS AND WEATHER.

OFF THE CAPE COLONY.*—General remarks.—The district under discussion lies between lat. 30° to 50° S., long. 10° to 40° E. Near the coast of Cape Colony, easterly and westerly winds alternate. In summer, easterly winds prevail; and in winter, westerly winds. Southerly winds (south-west to south-east) prevail throughout the year in the north-western part of the district (north-west of the Cape), but they extend further south in summer than in winter.

North and north-east winds prevail on the eastern side of the district (off, and southward of Natal); but at Natal the north-east and south-west winds appear to be equally divided. The prevailing winds at the different ports are mentioned with the description of the ports.

Summer months.—From October to April, the summer months, the prevailing winds are south-easterly, which occasionally rise to gales and last for three days, and at times for a longer period, being followed by calms and light westerly winds. These winds follow the trend of the whole coast of South Africa, being nearly from East between Natal and Algoa bay; south-east from Algoa bay to cape Agulhas, and from S.S.E. into False bay. In strength, the south-easters are singularly local at times; for instance, being light at cape Hanglip and Danger point to the south-eastward, when it may be blowing a heavy gale from the same quarter in Simons and Table bays.

Westerly winds and heavy westerly gales are nevertheless not

* See Admiralty Wind and Current Atlas; for more detailed information, see the Meteorological charts of the ocean district adjacent to the cape of Good Hope, by Captain Toynbee, F.R.A.S.

unfrequent in this season ; the best chance of avoiding them is to keep well in with the land ; there is also considerably less sea over the Agulhas bank than there is southward of it.

Winter months.—From April to October westerly winds prevail, and gales are especially severe and frequent south-eastward of the Agulhas bank in the months of June and July. In May, August, and September, between the coast and lat. 37° S., the east and west winds are about equally divided ; easterly winds occasionally occur in the other winter months.

The Roaring Forties.—It was formerly thought that between 40° and 50° South latitude, the wind was continually blowing from the westward. Modern investigation has shown that the winds here are cyclonic in their character, and that as the central depression is generally to the southward of 45° S., of large area, and has a progressive movement to the eastward, the winds blowing in the northern semicircle are mostly from the northern quarter, and commencing at about North will back to the north-west freshening as it does so, and frequently shifting more or less suddenly to the south-west where the strongest blow will be, with a rising barometer. A vessel steering eastwards, will therefore, hold the fair wind for a longer or shorter time, dependent on her own speed, and the velocity of the translation of the system, and when the latter is moderate, may carry the westerly winds with her for days.

From what has been said of the usual high latitude of the lowest barometer, it will be seen that though a vessel may have less wind about the parallel of 40° S., she will probably have a greater proportion of westerly wind than if she went further south, and that generally speaking the sea will not be so heavy. Hence this parallel is recommended as the best for making easting when proceeding from the Cape either to Mauritius, India, China, or Australia. From the shortening of the distance effected by following an approximation to the Great Circle track to Australia, vessels sometimes make quicker passages, but it is frequently at the expense of much straining and anxiety.

Should the area of lowest barometer of any system be further north than usual, the system of wind above sketched will not be followed, and the wind will veer instead of backing, and a hard easterly or south-easterly gale will follow.

GALES.—The severity of the gales off the Cape district is well known to navigators, as also the rapidity with which they succeed one another, and their violence during the winter months.

The proportion of gales in the usual track of outward bound vessels (about 40° S.), is as follows :—N.W., 42 per cent.; S.W., 29; N.E., 5; S.E., 7; exceptional, 17; and in the usual track of homeward bound vessels (near the coast), N.W., 27; S.W., 36; N.E., 8; S.E., 13; exceptional, 16. It has been found that, when during summer the barometer falls to 29.5, bad weather may be expected, and during winter that a fall to 29.75 will indicate a similar change.

A falling barometer when the wind is southerly, and the weather threatening, is a most useful warning in this part of the sea.

The probability of meeting with gales is as follows :—

| | | Outward route (40° S. and South- ward of). | | Homeward route (Near the coast). |
|---------|---------|--|-------|-------------------------------------|
| January | - - - - | 8 per cent. | - - - | 6 per cent. |
| April | - - - - | 10 " | - - - | 6 " |
| July | - - - - | 14 " | - - - | 13 " |
| October | - - - - | 9 " | - - - | 10 " |

The greatest number of gales are experienced between the south-east edge of the Agulhas bank and about 40° S., where the Agulhas current, deflected to the southward by the bank, meets the north-easterly drift from the Antarctic; here the struggle takes place between the warm and cold currents of the sea, and the warm and cold currents of the air, which go as it were hand in hand. On the south-east edge of the bank, in the months of June and July, about 30 per cent. of the winds are recorded as gales.

The gales in this area are frequently circumscribed in their limits, and consequently, the shifts of wind are sudden and violent, and may take place in any direction. The sea is, therefore, at times very heavy, particularly during south-west gales, and this area should, if possible, be carefully avoided by the seaman.

It frequently happens that a gale, which is blowing in this area for a lengthened period, is either moderate or not felt near the shore.

Westerly Gales amount to about two-thirds of the whole number experienced, and are of two classes, north-west and south-west gales. N.W. gales generally commence with a falling barometer, and sometimes their extreme force is not felt until the wind is about West. S.W. gales begin from the same quarter as N.W. gales, the first fall of the barometer coming with a northerly wind shifting to north-west, the chief difference being that with S.W. gale systems, the north-west wind does not attain the force of a gale.

Easterly Gales.—N.E. Gales form about 6 per cent. of the number experienced in the Cape region, and are usually met with in the eastern portion of the area (30° to 40° E.). They are generally

short and of slight force, and frequently lose the force of a gale before the lowest barometer occurs. Lightning is sometimes seen at the same time. The chief danger in connection with them lies in the fact of their being generally followed by north-westerly, south-westerly to southerly, or even south-east winds, and that in many cases these winds attain the force of a heavy gale. Sometimes the second gale sets in with a sudden change of wind. Hence great precaution is necessary in watching the barometer, weather, sea, etc., during a N.E. gale, more especially when met with near the south-east coast of Africa.*

S.E. Gales form about 10 per cent. of all gales met with off the Cape and south coast. They are of two classes, namely, those preceded by northerly and north-westerly winds, and those preceded by southerly or south-east winds. Those preceded by northerly winds resemble south-west gales in their character, setting in after the lowest barometer has passed, and lightning often occurs before the wind changes from the northward and westward to the south-eastward.

Those preceded by southerly winds are again subdivided, namely, (1) those fine weather gales generally met with near the Cape of Good Hope, more especially during the summer months, and which are accompanied by a slight fall of the barometer; these are closely related to the south-easters common to Table bay.

(2) Those related to the south-west side of cyclonic wind systems, moving southward or south-eastward. These are generally accompanied by bad weather, and are sometimes very severe; as these gales progress the wind often veers to the westward of south, the change generally taking place after the lowest barometer has been recorded. If necessary to heave-to in such a gale, the starboard tack should be preferred, as it is the coming up tack.

Exceptional Gales form about 16 per cent. of all gales met with off the Cape and South Coast. These are gales which change quickly from one quarter to another, or for some other cause cannot be classed under those previously referred to. A very dangerous type of exceptional gale is one that changes quickly from N.E. to N.W. or S.W.; it is frequently met with, but more especially near the south-east coast of Africa.

It is not possible to manoeuvre so as to avoid these, which shift suddenly from one quarter to another, so that when lightning and other weather signs, or the direction of the swell indicate such a

* Many vessels have been taken aback, and have foundered through neglecting these signs, particularly in the neighbourhood of Algoa bay.

change, the chief precaution lies in reducing sail, especially on the main and mizen masts. In gales which only shift from N.E. to N.W., and in which the barometer begins to rise as the wind goes to N.W., and also in those which shift quickly from N.E. through north to S.W., the port tack should be preferred, if requisite to heave-to.

Temperature.—Southward of Cape Colony, the air, like the sea, is warmest in February and coldest in July, strongly influenced by the temperature of the Agulhas current. It averages about 62° in February and 56° in July, on the parallel of 40° S., and 70° and 60° respectively near the coast. For temperature in Cape Colony, &c., see Climate and Rainfall, pages 18–21.

The sea temperatures off the Cape are given with the description of the Agulhas current, page 22.

Icebergs are rarely fallen in with off the cape of Good Hope to the northward of 40° S., or it may be said of 43° S.; nevertheless, there are instances of icebergs being seen near the cape in April and in September, and it is therefore desirable to keep a good look out for them at all seasons. From December to April icebergs are numerous near and southward of 45° S. Fogs are also prevalent south of that parallel. Icebergs are farthest north in the months of November to February, and therefore more liable to be met with; and least so in the months of June and July.†

In approaching icebergs there may be a marked diminution in the temperature of the air and sea, the indications therefore of the thermometer should never be neglected, though it must not be assumed to be an infallible guide.

Weather Signal.—A weather chart, from information telegraphed by the Meteorological Commission of the Cape Colony, is exhibited at each of the seaports in the Colony, soon after 10 a.m. daily, for the information of masters of vessels and others.

MOZAMBIQUE CHANNEL.

General remarks.—The winds in the Mozambique channel are dependent upon the monsoons of the Arabian sea, but do not, however, blow here with the same regularity that is found further north. The northerly monsoon commences between mid-September and mid-October, and the southerly monsoon between mid-March and mid-

* See also the diagrams of Lines of Equal Pressure and Lines of Equal Temperature in "Wind and Current Atlas for Pacific, Indian Ocean, &c."

† See Ice chart of the southern hemisphere, No. 1241; also Admiralty chart, No. 2095, on which icebergs that have been met with near the Cape Colony are shown.

April. The change is generally accompanied by squally weather. To the southward of lat. 20° S., from abreast the centre of Madagascar, the northerly monsoon is not felt and the winds are variable, with a greater prevalence of South and S.S.E. winds than any other, particularly on the Madagascar side, near the south-west end of which, S.E. and E.S.E. winds prevail all the year round, but do not extend far up the coast. *See also winds at Natal, p. 172, and Delagoa bay, p. 190.*

The northerly monsoon in the Mozambique channel, from its commencement to nearly the end of December is light and variable, with smooth water and usually fine weather; westerly winds and calms intervene. Towards the end of December the monsoon sets in strong; for three consecutive years the first decided blow was observed to occur at the Comoro islands, on the 25th December. It continues with some force until about the beginning of February, at which time, in the southern part of the channel, the southerly wind begins to make itself felt, and about the end of February it is fully established, though not with any force until April. Near the Mozambique coast, from and after December, calms, variables, and rain will be met with; though in mid-channel it is usually fine with a fresh breeze. During this northerly monsoon the southerly winds which prevail at the southern end of the channel often amount to a gale, producing a considerable sea; at such times they commonly force their way northward, overcoming the monsoon even as far north as the Comoro islands, and blow a double-reefed topsail breeze. This weather is preceded by heavy banks of cloud to the southward, with gloomy weather, but does not last long.

The southerly monsoon blows from S.S.E. to S.S.W. between Europa island and the Comoro group; it attains its greatest westing in May and June (S.S.W.); from July it gradually backs to the eastward; September to November calm and light winds are prevalent until northerly monsoon is established. The southerly monsoon is called the fine weather season, and is generally free from gales; but there is much more wind and sea at this time in the Mozambique channel than during the northerly monsoon; vessels proceeding to the southward will frequently find a hard double-reef topsail breeze and heavy sea.

On the coast of Madagascar, land and sea breezes prevail; the former being very light and lasting from about midnight till noon; the sea breeze generally sets in during the afternoon, increasing in force till sunset, when it subsides and gradually dies away towards

midnight, followed by the land wind. In the evening, within 20 miles of the coast, lightning and thick banks of clouds are common, having a threatening appearance, but generally harmless.

At the Comoro islands the south-west monsoon sets in about the middle of March, when heavy squalls from the westward and much rain may be expected; thence the monsoon forces its way up the African coast.

Calms.—During the northerly monsoon the frequency of calms is about 25 per cent., and in the southerly monsoon 10. In November they are most prevalent, being about 3 times as many as in June. The Madagascar coast is most subject to them.

Gales.—The Mozambique channel is subjected at times to hard gales and severe weather, independent of an occasional cyclone. These gales generally occur in the north-east monsoon period, and mostly begin with the monsoon freshening to a force of 6 to 7; it then slackens, with a steady barometer, the wind then shifts rapidly through west and then sets in as a violent gale from South to S.W.; occasionally the wind shifts through east. At times, also, the steep gradients are to the eastward, when the northerly wind will remain steady in direction but increases to a violent gale. The approach of these gales is generally foretold by a threatening sky to the westward, with lightning. Sometimes these gales occur after several days calm.

Cyclones.—The Indian ocean cyclones, which at times do so much damage in the vicinity of Mauritius, between the months of December and April, are usually intercepted by Madagascar before reaching the Mozambique channel, but occasionally one passes northward of the island into the Mozambique. One of these, the last recorded, crossed the Mozambique channel on January 28th–30th, 1887, in a westerly direction from northward of cape St. Andrew, its centre passing over the Castle Line ss. *Courland*, in lat. 20° S., long. 37° E., about 50 miles southward of the Zambesi. This vessel experienced strong S.S.E. winds when proceeding up the coast from Delagoa bay, with violent squalls, a constantly increasing sea and falling barometer; eventually she was compelled to head the terrific sea, when the centre passed over her. The only noticeable feature in an almost uniformly overcast sky—over which the drift scudded furiously—was a peculiar leaden blue in the zenith; there was no heavy solid banking up of clouds, and very little thunder and lightning; but the rain was heavy and continuous. The barometer, however, proved a true friend, and fell from 29·61 at

noon 29th, to 28·98 at 8 p.m. on 30th, at which time the centre passed over the ship, and the stars became visible overhead. The cyclone, blowing from northward on the coast of Madagascar, caused an extraordinary high tide and considerable sea at Mourandava, threatening the destruction of the houses, which hitherto had been considered far above the reach of the sea.

Cyclones have occurred towards the latter end of January in Mozambique harbour in former years, notably in the years 1841-2-3, see page 243, and that place was visited by a severe one on the 1st and 2nd of April 1858, during which several vessels were driven from their anchors in the harbour, and much damage was done.

The number of cyclones recorded in the South Indian ocean from 1856 to 1885, is appended, as having some bearing on the probability of an occasional one entering the Mozambique, or vessels proceeding to Mauritius from that neighbourhood. These figures may admit of modification when more data is at hand.

| No. | Month. | Progressive. | Stationary. | Per cent. of Stationary. |
|-----|-----------|--------------|-------------|-----------------------------|
| 64 | January | 45 | 19 | 30 |
| 53 | February | 47 | 6 | 11 |
| 53 | March | 34 | 19 | 35 |
| 49 | April | 25 | 24 | 50 |
| 18 | May | 7 | 11 | 61 |
| 3 | June | 1 | 2 | 66 |
| 2 | July | 1 | 1 | — |
| — | August | — | — | — |
| — | September | — | — | — |
| 5 | October | 2 | 3 | 60 |
| 21 | November | 8 | 13 | 61 |
| 32 | December | 23 | 9 | 28 |

EAST COAST OF AFRICA NORTH OF CAPE DELGADO.

On this part of the coast, and in the ocean to the eastward, the winds consist of the monsoons known as North-east and South-west.

The north-east monsoon commences in the Arabian sea about the middle of October, but does not at times reach the coast of Africa and Zanzibar until the middle or end of November; the change which may occupy a fortnight or more, is accompanied by shifts of winds, calms, squalls of rain and obscured sky. Occasionally the north-east monsoon is so light that many dhows from Arabia fail to reach Zanzibar, and have to put into Mombaza.

From cape Delgado to the equator, during the months of February and March, although part of the northerly monsoon period, winds prevail from E.N.E. to E.S.E. At this season, therefore, it is practicable for dhows to make their way thus far northward. The weather hereabout during these months is fine, with occasional showers and sometimes thunder and lightning, but no heavy squalls.

The south-west monsoon.—After an interval of calms and light winds, the south-west monsoon sets in, reaching Zanzibar some time in March, Ras Asir about the end of April, and Bombay about the first week in June. Southward and eastward of Sokotra it attains its full force in June, and continues until September, blowing stronger and steadier and accompanied by a heavier sea at a distance from the land than near it. On the east coast of Africa it blows very strong from about S.S.W. following the land, and continues with full force through the channel between Sokotra and Ras Asir. In May it has been observed to be influenced by land and sea breezes near Ras Asir, the wind hanging a great deal to the southward and eastward, with heavy squalls, rain, and overcast sky.

Off Zanzibar and to the southward as far as cape Delgado the so-called south-west monsoon blows from S.S.E., hauling south and S.S.W. as it approaches the land.

A cyclone, the only one on record, occurred at Zanzibar commencing at 9h. p.m., on the 14th April 1872, blowing strong from S.S.W., accompanied by rain; it increased in force and backed to South till about 1h. 30m. p.m. of the 15th, when it suddenly became calm, the barometer having fallen 0·9 inches below the normal height. At 2h. 15m. p.m. the barometer commenced to rise, and the cyclone burst upon the town and harbour from the opposite quarter N.N.E.. backing by North to W.N.W., where it settled, but moderated considerably between 4h. and 8h. p.m. One English steamer alone did not part her cables; all the other vessels in the harbour, including several vessels of war belonging to the Sultan, and numerous native vessels were driven ashore and wrecked.

On the island of Zanzibar, the cyclone swept over the island and destroyed all in its path, but leaving the southern part uninjured.

BAROMETER.*

The average range of the barometer in the higher latitudes between 50° and 60° is about 1·5 inches, but on extraordinary occasions ranges of 2·75 and 3·0 inches have been recorded.

* See also the diagrams of Lines of Equal Pressure and Lines of Equal Temperature in "Wind and Current Atlas for Pacific, Indian Ocean, &c."

In the track of outward bound vessels round the Cape, on the parallel of 40° S., the average height of the barometer is 29·9 inches, being about 0·15 higher in winter than in summer; it is higher towards the coast and lower towards the pole. The mean reading at Cape Town is 30·07, and at Natal 30·10; this, however, gives but an imperfect representation of the pressure in a district through which the areas of high and low pressure are constantly moving eastward, accompanied by their respective systems of wind.

In the intertropical regions the range varies from 0·4 to 0·2 inches, and in the neighbourhood of the equator it seldom exceeds 0·15 inches, this small change being in great measure due to the regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a warning of the approach of bad weather. The mean reading at Mozambique is 30·05; Zanzibar, 30·0, and Ras Asir 29·9 inches. During S.W. monsoon, at Mozambique it is ·05 higher, and at Ras Asir ·10 lower; Zanzibar varies but little.

The fall of the barometer in and near cyclonic disturbances ranges from 1·0 to 2·5 inches; the rapidity of the fall and the depression of the mercury increases as the centre of the storm approaches.

In the southern hemisphere the effect of the shifting of the wind on the barometer is according to the following law:—

With East, N.E., and North winds the barometer falls.

„ N.W. winds the barometer ceases to fall, and begins to rise.

„ West, S.W., and South winds the barometer rises.

„ S.E. winds the barometer ceases to rise, and begins to fall.

In the northern hemisphere the effect of the veering of the wind on the barometer is according to the following law:—

With East, S.E., and South winds the barometer falls.

„ S.W. winds the barometer ceases to fall, and begins to rise.

„ West, N.W., and North winds the barometer rises.

„ N.E. winds the barometer ceases to rise, and begins to fall.

CLIMATE AND RAINFALL.*

CAPE COLONY AND NATAL.—The cape possesses a healthy climate, which is doubtless attributable to the uniformity of temperature; it is much favoured by Europeans suffering from pulmonary complaints. The mean temperature at Cape Town is about 76° in February, and 59° in July. The summer may be said to commence in November, and continue until April.

* For temperatures of the air and sea at various places, if not found here nor in the body of the work, the reader is referred to the diagrams in the Wind and Current Atlas.

The colony of Natal, though nearer the tropics, is extremely healthy; the summer heat being greatly tempered by clouds and rain, whereas in winter the sky is usually cloudless. The mean temperature, 63° , is nearly the same as the Cape, but it is subject to greater range. Though the thermometer rarely rises above 85° in the shade, a scirocco, or north-west wind, will cause it to range between 85° and 97° ; the minimum for 6 years was 29° ; these temperatures are for Maritzburg. Thunder and hailstorms are of frequent occurrence in Natal in summer, October to April, the wet season.

The rainy season in the western portion of Cape Colony, as far eastward as Cape St. Francis, is during the winter, (the rains being brought by the westerly winds from the South Atlantic), June being the wettest month; but there is still a fair proportion of fine weather during that month. Smart showers begin about March, increasing gradually up to June, thence decreasing in like proportion until October. December and January are dry months. The rainy season in the eastern portion of Cape Colony, eastward of cape St. Francis and Natal, is during the opposite or summer season, the rain being brought by the easterly winds from the Indian Ocean. The neighbourhood of cape St. Francis, lying between the regions watered by winter rains on the west, and summer rains on the east, has rain nearly equally distributed throughout the year, though the greatest quantity falls at port Elizabeth between July and December.

The average rainfall is as follows:—Cape Town, 23 inches; Mossel bay, 14 inches; port Elizabeth, 22 inches; coast lands of Natal, 45 inches. The fall is considerably less generally, inland, as at Worcester, 50 miles from Cape Town, it is but 14; the same distance inland from Mossel bay, 8 inches; and at Maritzburg, 50 miles inland from port Natal, about 30 inches.

MOZAMBIQUE PROVINCE.—Delagoa bay to cape Delgado.—Nearly the whole of this coast consists of marshy land, and the large rivers during floods bring down immense quantities of decaying vegetable matter, particularly in Delagoa bay, and the delta of the Zambesi. The heavy rains which succeed great heat, the nightly dews and the exhalations produced by a powerful sun, all constitute natural causes which tend to the insalubrity of this coast. Innambán is considered to be the least unhealthy of the Portuguese stations, the temperature there being as low as 62° in July; but from November to May fevers should be specially guarded against. The best precautions are temperate living and non-exposure to the hot sun.

In the neighbourhood of Delagoa bay the rainy season is from September to March, or April ; none in the winter. The Gaza country between High Transvaal and Matabele Kafir land is rainless.

From the Limpopo to the Zambesi the rainy season is from November to April. The valley of the Zambesi is reached by the lesser rains late in October, when the sun is passing south ; these diminish in December, and are heaviest from January to the end of March or middle of April, when the sun is passing northward again ; the river soon begins to fall and is then most unhealthy. Near Ibo, however, the most unhealthy time is said to be from January to March, during the heavy rains.

At Mozambique harbour the rainy season is from November to March, or later ; between Mozambique and lake Nyassa from November to May.

ZANZIBAR COAST.—The climate has a bad reputation, but although there is undoubtedly much of a severe and sometimes fatal type of fever, its ordinary virulence and effects have been somewhat exaggerated. Europeans should, if possible, avoid being on shore at night until they are acclimatized, and especially so when they are in the vicinity of rivers.

The worst season for white people is from February to May, but the blacks seem to suffer more in July and August.

July, August, and September, are the coolest months, the thermometer on board ship ranging by day from 77° to 81°, and by night it occasionally falls to 73°. During January, February, and March, the hottest months, the day range is from 83° to 90°, and at night the temperature falls below 80°.

The Masika, or heavy rains, is ushered in by the south-west monsoon, with squalls, about the end of March, and lasts until the end of May ; the Mcho are occasional showers which fall through a month or six weeks in June and July ; the Vuli, or lesser rains, continue for three or four weeks from the latter part of September nearly through October. The yearly amount, perhaps, averages 150 inches, but the quantity, as well as the seasons are exceedingly irregular.

On the coast about Mombasa, the seasons are remarkably regular, the heavy rains are from end of March through June ; after a pause, followed by the Mcho in July ; August and September are dry ; in October and November the lesser rains fall ; then the dry season comes, November to April, when the sun blazes furiously, calling up a deadly haze, giving the country a dreary aspect, but after the first fall of the Masika all is life again.

At the equator, near the coast, the lesser rains fail altogether, but the sky at that time is often heavily clouded. In March, west winds

begin to blow, and land and sea breezes alternate, the south-west monsoon then sets in with heavy squalls and rain. The climate at Brava and neighbourhood, is reported to be healthy. From the equator to Ras Asir the rainy season is the same, from end of March to the end of June, and to July in the interior. The remaining months are dry, and the Juba river sinks rapidly towards the end of September. From Ras Asir, westward, rain also falls from November to February.

CURRENTS.

GENERAL REMARKS.—The currents on the south and east coasts of Africa are formed by the great trade drift of the South Indian ocean, which, advancing westward, and meeting with resistance from the island of Madagascar, begins to split near the islands of Mauritius and Bourbon; one portion passes northward of Madagascar and strikes the African coast near and northward of cape Delgado, between lat. 11° and 10° S., depending on the monsoon, being at its northern limit during the north-east monsoon period; here it again splits, one portion flowing southward through the Mozambique channel along the coast, past cape Corrientes and on to Natal. The southern portion of the main drift passes southward of Mauritius, thence southward of Madagascar and direct for Natal, uniting with the stream from the Mozambique, the two together forming the great Agulhas current.

The northern branch of the current, which divides near cape Delgado, flows northward past Zanzibar, and thence to Ras Asir during the south-west monsoon; during the north-east monsoon it is deflected from the land to the eastward before reaching the equator. The main currents will now be described in detail. The currents which prevail off the various ports are mentioned with the description of the ports.

THE AGULHAS CURRENT is formed by the two streams meeting, as before mentioned, north-eastward of Natal, in about lat. $28^{\circ} 30'$ S., long. 35° E.; these form an enormous body of warm water, which runs to the south-west and westward, skirting the coast of Africa at from 3 to about 120 miles off, and attaining considerable velocity between port Natal and the meridian of about 23° E., at times running from 3 to $4\frac{1}{2}$ miles an hour, its greatest strength being near the edge of the bank.*

The current in its progress to the south-west becomes weaker, and on reaching the Agulhas bank, does not, as a rule, run over the bank,

* H.M.S. *Ocean*, 8th March 1872, at noon, in lat. 34° S., long. $28^{\circ} 30'$ E. experienced during the last 24 hours, between Buffalo river and Algoa bay, a current setting S. 50° W. (*true*), 114 miles.

but follows its contour or edge with a tendency to branch off, and in long. about 22° E., the main body is deflected to the southward as far as the parallel of 40° S., whence a large part, being opposed by the north-easterly set from the Antarctic, recurves to the eastward, thus flowing back into the Indian ocean, but with diminished strength and temperature.

It has generally been considered that in the summer season (January–March) the Agulhas current attains its maximum strength and volume, and in the winter season (July–September) that it diminishes in force and extent, but from recent investigations it is considered that the current does not vary much in strength and direction throughout the year. The velocity of the current is said to be checked at times by westerly gales, and to run with increased strength afterwards, but it usually runs in the teeth of the gale, causing a dangerous high sea, especially near the south-east edge of the bank.

A small portion of the Agulhas current passes round and over the southern part of Agulhas bank, and branching off to the north-west, past the cape of Good Hope, is joined by the connecting current of the South Atlantic ocean, collectively forming a wide stream running northward along the coast, at the rate of one or $1\frac{1}{2}$ miles an hour, with a tendency towards the coast at times, which must be guarded against. This warm water seldom reaches into Table bay, the water there being much colder than Simons bay. The sea temperature in the latter is from 62° to 64° in November; this warm water during long north-west gales is occasionally driven out and replaced by water from the south Atlantic, at a temperature of about 50° , with a counter easterly set. At such times the northern branch of the Agulhas is probably deflected to the southward with the main portion of the current.

The range of sea temperature near the land is greatest in January and February reaching 20° . In August, September, and October, the range is less than 15° . The area in which the range amount to 15° is greatest in April. Off Natal the average temperature is 73° , and off the south-east edge of Agulhas bank 67° . In the neighbourhood of 40° S., where the warm and cold currents meet, the 20° range of temperature exists throughout the year. It is rather larger in the winter and spring than in the summer and autumn months.*

Caution.—Inner edge of the Agulhas.—Although the southern edge of the Agulhas current has a tendency to set from the land, the northern edge on the contrary has a tendency to set towards the land, more especially to the westward of Algoa bay, where during and after south-east, westerly, and north-westerly gales, the

* See the Admiralty Wind and Current Charts, with Temperature charts.

current is at times deflected from its general course and turned directly towards the land, causing a very dangerous element in the navigation of the south-east coast of Africa, if disregarded and not allowed for.

From this cause a large number of valuable vessels have been wrecked, more especially between Algoa bay and cape Agulhas, and the necessity of guarding against these insidious dangers cannot be too strongly impressed on those in charge of vessels proceeding along this coast. *See Inshore counter current, mentioned below, also p. 75.*

Agulhas Counter Current.—The remarkable recurving of the main body of the Agulhas current is due to the action of a polar or cold water current flowing from the south-west ; the junction of the hot and cold waters of the two streams notably taking place off the Agulhas bank, giving rise to the confused sea, the irregular set of the currents, and by their effect on the atmosphere to those severe and fitful gales so well known to seamen rounding the cape of Good Hope. The meeting of these currents is frequently denoted by a broken, confused, and heaped-up sea, the warm current is also indicated by a marked change in the colour of the water, which, combined with the agitation of the sea, frequently conveys the impression that the vessel is in soundings.

The large body of water deflected and turned to the eastward runs chiefly between the parallels of 37° and 40° S., and though its strength is variable its average rate may be about $1\frac{1}{2}$ miles an hour. It is rather stronger and more northerly in the summer than in the winter, owing probably in some degree to the melting of the ice in high southern latitudes, and to the smaller amount of westerly winds experienced to the northward of 40° S. in summer. It becomes more extensive than the Agulhas current and to the eastward of the meridian of 28° E., it is traced northward to about latitude 36° S. A current of 3 miles an hour has been experienced in latitude 39° S.

Inshore Counter Current.—Near the land, between capes Hangklip and Agulhas, the current occasionally sets in an E.S.E. direction, or dangerously towards the land, at the rate of about one mile an hour ; many vessels have been lost here by not allowing for this possible set and thus keeping a sufficient offing.

Between cape Agulhas and Kowie river (longitude 27° E.), an inshore current setting eastward at about the same rate is also frequently experienced in fine weather, and except off the mouths of the rivers, it follows the trend of the land, and is said to extend from one to 6 miles off-shore. *See caution on pages 22 and 23.*

MOZAMBIQUE CHANNEL.—As previously stated (page 21), the northern branch of the Indian ocean trade-drift splits in the neighbourhood of cape Delgado, about latitude 11° S.; ranging as far north as 10° S. during the north-east monsoon period. The portion of this branch which turns to the southward along the Mozambique coast, averages 2 miles an hour, increasing at times during the strength of the northerly monsoon to 3 to 4 miles, and decreasing during the southerly monsoon period to about one to 2 knots, and at times during its strength to nothing. This main stream lies between the coast reefs and a distance of 50 to 80 miles from the land, beyond which a counter or variable current will generally be experienced. Off Mozambique the current has been known to set S.E. by E. 4 miles an hour, and 60 miles to the southward N.N.W. and W.N.W., from one to $2\frac{1}{2}$ miles, and as before stated, at times it is nil; so that repeated observations for position are necessary as well as a careful estimation for the strength of the current likely caused by the prevailing monsoon. Between the Comoro islands and the outer edge of the southerly coast current, and thence southward until past the narrow part of the Mozambique channel, there is no dependence to be placed on the direction or force of the current—it may run 3 miles an hour one way, and at times as much another.

In the vicinity of the Comoro islands the current generally runs to the westward, but a little to the southward of the islands there is frequently a counter current setting to the eastward. Northward of the Comoro islands a north-westerly current of one or $1\frac{1}{2}$ miles an hour is generally found.

Ferguson's wind and current charts show a current setting north-westward from the south extreme of Madagascar, between the months of May and August (the strength of the southerly monsoon) as far west as 40° E., up past Europa island and northward along the African coast, but the observations appear to be few. In the middle of Mozambique channel, southward of lat. 18° S., there is more often a northerly than a southerly current, the wind being generally from the southward. In the vicinity of Europa island, in November, it has been found setting north-westward from 2 to $2\frac{1}{2}$ miles an hour, causing strong tide rips. As the rate and direction of these currents may not be the same for two consecutive days, frequent observations for the vessel's position are imperative, especially when in the vicinity of Europa island where the current is very variable.

The current setting westward, north of Madagascar, averages 2 miles an hour, not unfrequently 3 miles, but this strength does not extend more than 50 miles northward of cape Amber.

Near the north-west coast of Madagascar there is generally a north easterly counter-set of about one mile an hour, but more in the offing the current is not to be depended on, especially during the northerly monsoons period. Off cape St. Andrew the current often sets strongly to the westward.*

Between Innambán and Sofala, on the African coast, there is often a counter current for a considerable distance off-shore, especially towards Sofala ; in May, a rate of 35 miles a day has been recorded.

EAST AFRICA COAST CURRENT.—The velocity of the northern portion of the northern branch of the Indian ocean trade drift, which splits near cape Delgado, is much influenced by the monsoons ; its average rate may be taken at 2 miles an hour, but during the south-west monsoon it runs past Mafia, Latham, Zanzibar, and Pemba islands and channels at from 2 to 4 miles an hour, and in the north-east monsoon from one to 2 miles an hour, as far as about lat. 2° S.

During the south-west monsoon period the whole mass of water continues north-eastward along the coast, across the equator, on to Ras Asír and Sokótra, at the rate of from 36 to 100 miles a day ; the greater rate has been experienced on the equator near the coast, and also near Ras Hafún and Ras Asír during the strength of the monsoon. The current becomes weaker as the distance from the shore is increased on the equator, in from 48° to 52° E., or about 300 miles from the land, there appears to be little or no current.

Also, the northerly current has been found and lost at about 100 miles eastward of Zanzibar ; in the early part of August, it was found setting but little to the northward of West, *true*, and continued so with little variation at the rate of one to 2 miles an hour until to the northward of lat. 6° S., in long. 49° E., from whence to the Seychelles to the northward of that parallel an easterly set of about three-quarters of a mile an hour was experienced.

Southward of Sokótra, at a distance of about 150 miles, is a great whirl of current, caused possibly by the interposition of the island ; or, it may be, that shoaler water exists at this spot ; it commences about the parallel of Ras Hafún, when the current strikes off to the eastward to the 55th meridian, then to the southward, to the 6th parallel, whence it again curves to the north-eastward, through west, forming a complete whirl. At the northern limit the velocity is about 4 miles per hour, while at its southern extreme it is only

* The currents on the coasts of Madagascar will be found more fully described in the Sailing Directions for Islands in the Southern Indian Ocean, &c., shortly to be published.

about one mile per hour. A very heavy confused sea is created by this whirl. Care should be taken to avoid the strongest portion of the current in making the coast of Africa from the eastward, by keeping well to the southward.

Although the strength of this current along the coast may be less near the close of the south-west monsoon, and at other periods capricious, yet it is occasionally felt strong as far as the parallel of 4° N. up to the first week in December; but as the time of the change of monsoon varies, so at other periods the current may set to the southward a month or more earlier, and thus no dependence can be placed on the exact time of change.

During the north-east monsoon period, this northerly set from cape Delgado meets the southerly set from the Arabian sea and Sokótra, between Lamu and Castle point, (lat. $1\frac{1}{2}^{\circ}$ to $2\frac{1}{2}^{\circ}$ S.), the two producing an off-set from the land. In the offing the southerly set continues, gradually curving to the eastward, and forming the easterly set to the Seychelles in the track of the north-west monsoon.

The meeting, however, of the two currents in the vicinity of Castle point (as at cape Delgado) must be accepted with considerable limitation, as it probably varies with the season, extending southward according to the strength of the north-east monsoon, the full force of which is between December and March.

Although the current in the Arabian sea sets to the south-west from about the middle of October, it does not reach Magadoxa, on the African coast, until about the second week in December; it is said to begin to run off that place almost invariably with bad weather from the north-east; at a distance from the land it sets to the south-west a month earlier. It is also stated that the south-westerly current does not continue for a longer period than about three months, its strength generally being from one to 2 knots an hour. In April, between Formosa bay and port Durnford, a current setting S.W. by S. 88 miles in 24 hours, is said to have been experienced by H.M.S. *Lyra*, nine days only before the south-west monsoon set in, but this is a very exceptional instance.

PASSAGES FROM THE CAPE OF GOOD HOPE TO AND FROM PORTS IN EAST AFRICA AND INDIA.

GENERAL REMARKS.—There is little difficulty in passing eastward round the cape of Good Hope at any period of the year, though a greater proportion of gales will be met with in the winter season (April to September).

From the South Atlantic, or from the Cape, vessels are recom-

mended to cross the meridian of 20° E., in from lat. 39° to 40° S. Vessels may make quicker passages by going farther south (lat. 42° to 44°, especially from November to March), but better weather will, as a rule, be found on or about the parallel recommended. Should a south-easterly wind be blowing on leaving Table or Simons bays, stand boldly to the south-westward until the westerlies are reached, or the wind changes to a more favourable direction. In all cases where vessels are making for the 40th parallel south of the Cape, they should steer nothing eastward of south, so as to avoid the area to the south-east of the tail of Agulhas bank, where gales and heavy cross seas prevail. *See p. 11.* The amount of easting required to be made depends on the prevailing monsoon in the Indian ocean, for which, see the passage required.

From October to April easterly winds prevail as far south as the tail of Agulhas bank (about 37° S.), with variable winds, principally westerly, beyond it. In the months of May and September, at the tail of the bank, easterly and westerly winds are in equal proportion, but between these months westerly winds prevail, extending sometimes close into the coast.

June to August, inclusive, are therefore the worst months, and January and February the best months for proceeding westward round the Cape. It should be borne in mind that there is much less sea on the Agulhas bank, in from 60 to 70 fathoms or less, during heavy gales, than there is near its edge and southward of it. *See p. 72.* If it be found necessary to heave to, the port tack should be chosen, as (with the exception of south-east gales beginning with south-east winds) the shift of wind is almost invariably against the hands of a watch, and the vessel will come up to the sea. *See page 12, on south-east gales.*

OUTWARD (EASTWARD) ROUTES.—FULL-POWERED STEAM VESSELS.*

Mail steamers and similar full-powered steam vessels leaving the Cape for ports in the Cape Colony or east coast of Africa, take the direct route in-shore, thus avoiding the strength of the Agulhas current, and being sometimes assisted by a counter current, extending from one to six miles off-shore, particularly between cape Agulhas and Kowie river; also between Natal and cape St. Lucia, and Kosi river and Delagoa bay, there is, as a rule, no current within 3 miles of the shore. The dangerous set eastward, towards the land, some-

* See Admiralty chart of the World, No. 1077, showing the tracks followed by full-powered steam vessels.

times experienced between capes Hangklip and Agulhas, and also the dangerous set of the northern edge of the Agulhas current, north-westward towards the land, during and after gales, in the vicinity and westward of Algoa bay, must be particularly guarded against (pages 22, 23). From Algoa bay, if not wishing to hug the shore, a vessel might push 100 miles to the eastward, where the current is weak, thence parallel to the shore until abreast Natal, if bound there. Also, north-eastward of Natal, if not desirous of hugging the shore, a vessel might push eastward nearly to the meridian of Europa island, whence probably she will meet with a favourable current and a southerly wind, carrying her past that island, and to the Comoro islands, eastward of the Mozambique current. On account of the uncertain set of the currents in the Mozambique channel, frequent observations for ascertaining the position of the vessel are imperative. Northward of cape Delgado the current is favourable near the coast.

Zanzibar to Aden, during north-east monsoon, the coast should be avoided northward of 2° S., on account of the strong adverse current. Mail steamers steer E.N.E. until about 120 miles from the land, then parallel to it until in lat. 6° N., thence to Ras Asir.

VESSELS WITH SAIL AND AUXILIARY STEAM POWER.

CAPE to NATAL.—From April to October, inclusive, the prevailing winds are westerly, when all classes of steam vessels may make the passage near the coast, being sometimes favoured by a counter current; but guarding against in-draught, as before mentioned, at pages 22, 23.

From October to April, when the prevailing winds near the coast are easterly, vessels must first make southing from the Cape,* crossing the meridian of 20° E. in from 39° to 40° S., depending on the parallel on which a steady fair wind is picked up (in January the permanent westerly winds are not usually northward of 40° S.); thence eastward, crossing the meridian of 30° E. in about 39° S., and the meridian of 36° E. in 36° S., from whence, if the vessel will head N.E. by N. with steam and sail, she may do so, striking the parallel of Natal in about 34° E.; thence westward to Natal, making ample allowance for crossing the Agulhas current, which will be found setting south-westward from $1\frac{1}{2}$ to 3 miles an hour. If the vessel will not head N.E. by N. from the position mentioned, more easting should be made before turning towards the port.

* See General Remarks, pages 26, 27.

CAPE to MOZAMBIQUE and ZANZIBAR.—April to October.—Along the coast as far as Natal, and beyond if the winds remain favourable. Moderate-powered vessels might get up in-shore in the same way as those of full-power, but those under consideration, when they meet with adverse north-easterly winds, and are making but little progress in-shore, should stand away south-eastward, endeavouring to cross lat. 30° S. (the parallel of Natal) in about 42° E.; here they will probably be within the influence of the south-east trade winds; thence the course is nearly due north, with a favourable wind, preserving the long. 42° E., passing between Europa island and the coast of Madagascar, and close westward of Juan de Nova (page 462). If bound to Mozambique, it may be steered for when abreast, bearing in mind the strong southerly set, which may be experienced when nearing the land, of from 2 to 4 miles an hour. If bound to Zanzibar, continue on from St. Juan de Nova, passing close westward of Great Comoro, thence direct to Zanzibar, sighting Mafia island to ensure a correct land-fall. Northward of cape Delgado the current will be favourable, and at the rate of 2 to 4 miles per hour. *See page 364, for approaching Zanzibar channel.*

October to April.—From the Cape, same route as for Natal as far as lat. 36° S., long. 36° E.; thence continue north-eastward, crossing the parallel of 30° S. in about 42° E.; here the vessel will probably meet with the south-east trade, and can then proceed as in the months of May to September, keeping in about long. 42° E., and passing close westward of Juan de Nova. If bound to Mozambique, make the land northward of it, as both wind and current will tend to set the vessel southward on nearing the coast.

If bound to Zanzibar, pass close westward of Great Comoro island; a favourable current will be experienced when northward of cape Delgado, and the fore and aft sails will probably stand. *See also page 364.*

An alternative route to the Comoro island and Zanzibar, and perhaps a quicker one for a small powered vessel, is that eastward of Madagascar. Easting should be made in from lat. 39° to 40° S. from off the Cape, to about long. 45° E., thence north-eastward, crossing lat. 30° S. in long. 53° E., thence due North with south-east trade, passing midway between Madagascar and Reunion, thence to sight the north extreme of Madagascar, when the wind and current will be favourable to Comoro and Zanzibar.

* See Admiralty Chart of the World, showing tracks followed by vessels with sail and auxiliary steam power, No. 1078; also the Admiralty Wind and Current Charts for Indian Ocean, &c.

CAPE to MAURITIUS.—The route is nearly the same all the year round; make southing from the Cape, cross the meridian of 20° E. in from 39° to 40° S., thence make easting to 50° E., thence north-eastward, crossing the parallel of 30° S. in about 59° E., thence direct to Mauritius with the south-east trade wind.*

CAPE to BOMBAY.—April to October.—If bound to Bombay, proceed as for Mozambique; thence the course may be set direct from the Comoro islands, crossing the equator in 53° E., but considerable advantage would be derived by following the strength of the current northward from Delgado to the equator, crossing in about 45° E., then parallel to the coast to 4° or 5° N., thence direct to Bombay, keeping well southward of the heavy sea caused by the whirling current southward of Sokótra, which sometimes extends down to lat. 6° N.

Or the route to Mauritius may be taken, as above, thence westward of Saya da Malha bank, across the equator in 62° E., thence direct to Bombay.

A route midway between these two may also be taken, passing close eastward of the north end of Madagascar.

October to April.—Make southing from the cape, crossing 20° E. in from 39° to 40° S., keeping between these parallels as far as long. 60° E., thence north-eastward, crossing lat. 30° S. in long. 70° E., and 10° S. in 72° E., passing close eastward of Diego Garcia, and crossing the equator in from 76° to 78° E., thence along the west coast of Hindustán to Bombay. *See West coast of Hindustán pilot.*

CAPE to CALCUTTA.—April to October.—Make southing from the Cape to 39° or 40° S., thence between these parallels to about 62° E., thence north-eastward, crossing the meridian of 80° E. in 26° S., and 82° E., in 20° S., thence across the equator in about 82° E., skirting Ceylon, thence to Calcutta. *See Bay of Bengal pilot.*

October to April.—Making southing from the Cape, to 39° or 40° S., thence eastward between these parallels as far as St. Paul's, or to about 80° E., thence north-eastwards, keeping in long. 88° E., between the parallels of 30° to 10° S.; thence north-eastward, crossing the equator in 93° to 95° E., thence eastward or westward of the Nicobar and Andaman islands to Calcutta. A vessel will be in a much better position for getting up the bay of Bengal, if, when approaching Achi head, the wind admits of her passing within 100 miles of it, thence to windward of the islands mentioned.

CAPE to SUNDA STRAIT.—April to October.—Eastward

* See page 27, paragraph 1.

as for Calcutta, in opposite season, to St. Paul's, or to about 80° E., thence to lat. 30° S. long. 100° E., and 20° S. in 105° E., passing close westward of Christmas island with the easterly monsoon, to Java head. *See China Directory, vol. I.*

OCTOBER TO APRIL.—Eastward to St. Paul's, as before thence north-eastward, crossing lat. 30° S. in long. 95° E., 20° S. in 100° E., and 8° S. in 102° E., thence eastward with the westerly monsoon to Sunda strait. If contrary winds are met with after passing St. Paul's, a vessel may steer at once to the northward, into the westerly monsoon, which monsoon will carry her direct to Sunda.

CAPE TO AUSTRALIA.—Make southing from the Cape, crossing the meridian of 20° E. in from 39° to 40° S., at all times of the year, and continue on or about that parallel to the eastward. *See Australia Directory, Vol. I.**

CAPE TO KERGUELEN, same route as to Australia, but shaping direct course for Bligh's cape, near north extreme of Kerguelen island from about long. 45° E.

CAPE TO CROZETS OR PRINCE EDWARD ISLANDS.—Same route as for Australia, but shaping direct course from lat. 40° S., long. 20° E.

NATAL TO MAURITIUS.—The route is about the same at all seasons, standing south-eastward from Natal, making a circular track to about 35° S., and again reaching the parallel of Natal in about the meridian of Mauritius, lat. 30° S., long. 58° to 59° E., thence direct in the south-east trade.

MOZAMBIQUE TO MAURITIUS.—APRIL TO OCTOBER.—The route is southward from Mozambique, near the land, keeping in the strength of the Mozambique current as far as cape Corrientes, or beyond, into the south-west winds, thence make the best way eastward in about the parallel of 30° S., to the meridian of Mauritius, thence direct in the south-east trade.

NOVEMBER TO APRIL.—The route is northward from Mozambique, passing close westward of Great Comoro and Aldabra islands, thence making the best way eastward, passing round the Saya da Malha bank, then direct to Mauritius in the south-east trade. The current is about one mile an hour adverse, to Saya da Malha bank. The southern route, before mentioned, may also be taken at this season.

ZANZIBAR TO MAURITIUS.—APRIL TO OCTOBER.—From Zanzibar the route is midway between the Seychelles and the equator, in the south-west monsoon, crossing the meridian of 60° E.

* See page 27, paragraph 1.

in about 3° S., thence steaming south-eastward into the south-east trade to about lat. 5° S. long. 63° E., whence passing eastward of Saya da Malha bank, Mauritius will be fetched on the port tack. *See* passage to Seychelles, below.

November to April.—Eastward from Zanzibar with north-east and westerly monsoons to Saya da Malha bank, passing north-eastward of it, thence steaming southward into the south-east trade, thence direct to Mauritius on the port tack.

ZANZIBAR to SEYCHELLES.—**April to October.**—The quickest way is to steam a direct course, taking advantage of any slight shift of wind to assist with fore and aft sails. During the early part of August, when the south-east trade blows strongest and reaches the African coast, and the current is running strong to the northward, the passage is somewhat tedious. A small powered vessel might stand off on the starboard tack (as for Mauritius); should she reach north of the equator, she will, when eastward of the Seychelles have no difficulty in fetching the islands, owing to the favourable current which may be relied on as far south as lat. 4° S., and at times even 6° S.

November to April.—Same route as to Aden, *see* page 33.

ZANZIBAR to ADEN.—**April to October.**—In this, the south-west monsoon period, all vessels take the direct route, passing through Pemba channel and keeping near the African coast the whole way to Ras Asir, to get the full benefit of the northerly current which runs with a velocity of 60 to 100 miles per day.

Precautions necessary in rounding Ras Asir.—As many large and valuable vessels have from time to time been wrecked with loss of life on the coast to the southward of Ras Asir (cape Guardafui), the seaman should use the utmost caution when bound round this headland from the south or south-eastward, during the south-west monsoon, when the weather is stormy, accompanied by a heavy sea and strong current, and the land is generally obscured by a thick haze.

The similarity between the outlines of the headlands of Ras Jard Hafun and Ras Asir is a fertile source of disaster. Ras Jard Hafun is much the higher (2,900 feet), Ras Asir being about 780 feet, and separated from Ras Jard Hafun by a broad sandy plain of little height compared with the two headlands that bound it. In hazy weather at night the steep fall of Jard Hafun is dimly seen from the deck of a vessel, and when this bears southward of West, if Ras Asir is not sighted, as is often the case from the haze being thicker in the lower strata, and also from the light colour of the hill rendering it difficult to discern, the navigator fancies he has rounded

it already, and steers to the westward into the low bay of Wadi Tuhom.*

During day-time, a gradual change will probably be seen in the colour of the water from blue to dark green. Attention should also be paid to the alteration in the direction of the swell caused by the promontory of Ras Hafún ; the water gets smoother and the swell alters its direction to the eastward of south, when the meridian of that cape is passed.

It has been stated that the temperature of the sea surface decreases considerably as the coast between Ras Hafún and Ras Asír is approached, a sudden rise to a temperature of about 80° taking place only to the northward of Ras Asír, and that this rise in temperature can be safely taken as an indication that the cape is passed, and that the vessel's course can be shaped westwards with confidence.

An examination by the Meteorological Office of a large number of observations on temperature show that this is not the case. While it is true that the temperature of the sea north of Ras Asír is invariably high, the temperature to the southward, and especially off Ras Jard Hafún, is not invariably low, and any action founded on the thermometer would, therefore, be most dangerous.

To ensure safety, when the land cannot be clearly seen and recognized, especially at night, the lead, and the lead alone, can be relied on.

As soundings extend from 10 to 12 miles from the coast, the deep-sea lead should be frequently used, and the vessel's course altered to N. by E. or N. by E. $\frac{1}{2}$ E., or if necessary more to the eastward, immediately soundings are struck, or the land sighted in dark or hazy weather. By steering to the northward as above, and by not standing into less than 35 fathoms water, the vessel's safety will be ensured, and as the water rapidly deepens northward of the parallel of the cape, the 100-fathoms line of soundings being only $2\frac{1}{2}$ miles from it, there will be no difficulty as to the time when the course should be altered to the westward.

Westward of Ras Asír, the African coast should be kept aboard as far as Burnt island ; thence direct to Aden. See Gulf of Aden Pilot

November to April.—From Zanzibar to Aden or Seychelles, small-powered steam vessels may proceed through Pemba channel to take advantage of the favourable northerly current, as far as about lat. 3° S., or near Lamu, whence she may gradually steal towards the

* A full description of the land about Ras Asír will be found at pages 457-8. From 1876-1882, seven vessels were wrecked and three stranded in the neighbourhood of Ras Asír ; in August 1885 the steamer *Dalmatia* was wrecked 15 miles southward of it (5 miles southward of Ras Jard Hafún).

equator, and on to the Seychelles on the port tack. From Seychelles, the westerly monsoon will take her, with a leading wind, to the equator, which should be crossed in about long. 61° E., thence steaming to the northward, the wind will gradually haul through north to N.E., enabling the vessel with steam and sail, from lat. about 6° N., to fetch Ras Asir, thence with a fair wind to Aden.

ZANZIBAR to BOMBAY.—April to October.—Northward through Pemba channel, when course may be shaped direct; but advantage may be taken of the strong coast current as far as lat. 4° or 5° N., thence direct to Bombay, keeping well southward of the heavy sea caused by the whirling current southward of Sokotra, which sometimes extends down to 6° N.

November to April.—As for Aden (page 33), to abreast the Seychelles, passing on either side; thence with the westerly monsoon, in about the parallel of 5° S., to long. 7° E.; from thence, north-eastward across the equator in 76° to 78° E., and northward up the west coast of Hindustan to Bombay. See west coast of Hindustan pilot.

ZANZIBAR to CALCUTTA.—April to October.—Course is direct, passing either southward of Chagos or through the one and a-half degree channel, past Ceylon, and up the west side of the bay of Bengal.

November to April.—Northward through Pemba channel, to lat. 3° S., or near Lamu, as for Aden (page 33), thence on the port tack to Seychelles; thence, with the westerly monsoon, the parallel of 5° S. should be kept, until in long. 90° E., crossing the equator in 92° to 94° E., thence to Calcutta.

PASSAGES FROM THE PORTS IN EAST AFRICA AND INDIA TO THE CAPE OF GOOD HOPE.—HOMEWARD (WESTWARD) ROUTES.

FULL-POWERED STEAM VESSELS.

ZANZIBAR, MOZAMBIQUE, or other East African ports, to the Cape of Good Hope.—Full-powered steam vessels take the direct route alongshore at all seasons of the year. From near Cape Delgado, or from lat. 10° to 11° S., the coast current is favourable for the whole distance to the Cape, from one to 3 miles per hour; near Natal at times it amounts to 4 miles per hour. Between Algoa bay and Mossel bay the strength of the current lies from 50

to 100 miles off-shore ; this distance might be kept with advantage, but it is advisable to sight Cape Agulhas light. June to August are the worst months for passing westward round the Cape of Good Hope.

CALCUTTA and SUNDA STRAIT, to the CAPE.—The full-powered steam vessel route is direct to Mauritius, thence about 100 miles southward of Madagascar, making the African coast about 200 miles southward of Natal ; thence in the strength of the Agulhas current to the Cape, as above mentioned.

BOMBAY to the CAPE.—The route is direct for Mozambique, thence down the African coast with the Mozambique and Agulhas current, as above. During the height of the south-west monsoon, on leaving Bombay, a S.S.W. course should be taken to about 9° N., where the wind becomes lighter and the water smoother, thence across the equator in about 57° E., close westward of the Seychelles to Mozambique, &c.

ADEN to ZANZIBAR.—During the strength of the south-west monsoon, the British India mail steamers make the passage, with the assistance of fore and aft sails. From Ras Asir, they keep nearly close hauled on the starboard tack to about the meridian of 54° E., thence making due South to about 2° N., from whence they fetch Lamu, on the port tack. This route avoids heading the heavy sea southward of Sokotra, and also the strong north-easterly current of 3 to 4 miles an hour, probably found within 50 to 100 miles of the coast. Little or no adverse current will be found on the meridian of 54° E., southward of lat. 8° N.

Bound to Zanzibar, continue the due South course as far as the equator, crossing it in long. 54° E., thence on the port tack ; the distance may be shortened under favourable circumstances of wind and weather by crossing the equator farther west.

VESSELS WITH SAIL AND AUXILIARY STEAM POWER.*

CALCUTTA to ZANZIBAR.—April to October.—Due South from Calcutta, crossing the equator in about long. 90° E., thence south-westward across the doldrum space to pick up the south-east trade, to probably 5° or 6° S., thence *via* Diego Garcia and the Seychelles with the trade to Zanzibar. See page 364.

During the height of the south-west monsoon, it might be advisable (as in a sailing vessel) to pass eastward of the Andamans and Nicobars, thence westward of Achi head ; the equator will

* See Admiralty chart of the World, No. 1078, showing the tracks for vessels with sail and auxiliary steam power.

scarcely be crossed westward of long. 95° E., but when well in the south-east trade, steer to the westward past Diego Garcia and Seychelles to Zanzibar.

October to April., the route is direct.

BOMBAY and SEYCHELLES to ZANZIBAR.—May to September.—Stand on the starboard tack with fore and aft sails, about S.S.W. from Bombay ; the monsoon will abate and the sea become smoother in about 9° N. ; whence stand away free across the equator, crossing in about long. 70° E., or more westward if the wind permits, thence southward across the narrow doldrum space to about lat. 3° S., whence the south-east trade will carry the vessel to Seychelles or Zanzibar, making due allowance for the strong northerly current when approaching the latter island. In May, before the south-west monsoon has set in at Bombay, a vessel will proceed direct until the monsoon is met with, thence on the starboard tack into the south-east trade as before stated. During the height of the south-west monsoon, it is advisable to run down the coast from Bombay, eastward of the Maldivh and Laccadivh groups, thence across the doldrums and proceeding as before

October to April.—From Bombay and Seychelles the route to Zanzibar is direct.

ADEN to ZANZIBAR.—May to September.—Having passed northward of Sokôtra, stand away to the south-eastward, crossing the equator in from 70° to 72° E., thence as from Bombay, p. 35.

October to April.—From Aden, the route is round Ras Asir, thence direct to Zanzibar.

MAURITIUS to ZANZIBAR.—The route is direct at all seasons of the year, passing near the north end of Madagascar, and entering Zanzibar from the southward, taking care to make the land about the north point of Mafia to allow for the strong but variable northerly current (*see* p. 364).

MAURITIUS to MOZAMBIQUE.—The route is direct at all seasons of the year, passing near the north end of Madagascar, guarding against the strong southerly set of the current when approaching the port of Mozambique (*see* p. 24 and 237).

MAURITIUS to NATAL and the CAPE.—The route is nearly direct at all seasons of the year, with a favourable wind and current, passing about 100 miles southward of Madagascar, to Natal. In December and January it is advisable to make more southing when leaving Mauritius, as westerly winds are occasionally found at that time between it and Madagascar, but those are not frequent. If not bound to Natal, the African coast might be made about 200 miles

southward of it, thence alongshore in the strength of the Agulhas current, passing about 50 miles off Algoa bay, 100 miles off Mossel bay, and sighting Cape Agulhas light before shaping course for the Cape of Good Hope.

KERGUELEN to the CAPE.—From Kerguelen the route is northward going free on the port tack with the prevailing westerly wind into the south-east trade to about 25° S., thence to the westward, passing about 100 miles southward of Madagascar, and making the coast of Africa about 200 miles southward of Natal, proceeding as just before mentioned.

CROZETS and PRINCE EDWARD ISLANDS to the CAPE.—Stand northward as from Kerguelen, thence to the African coast.

SUNDA STRAIT to the CAPE.—**May to October**, direct, passing southward of Rodriguez, and about 100 miles southward of Madagascar, and making the African coast as from Mauritius, p. 36.

November to April.—From Sunda strait on the starboard tack, with the westerly monsoon, passing westward of Christmas island into the south-east trade; thence direct for Madagascar, thence as from Mauritius, page 36. It must not be forgotten that this is the cyclone season, when the barometer and weather signs should be carefully noted.

TORRES STRAITS to the CAPE.—**May to October**, the route is southward of Keeling islands, and crossing the meridian of 80° E. in lat. 18° S.; thence passing 100 miles south of Madagascar, as from Mauritius, page 36.

SOUTH AUSTRALIA to the CAPE.—**December to March**, from Cape Leeuwin, the course is north-westward to lat. 20° S., long. 80° E., thence to about 100 miles southward of Madagascar, as from Sunda strait and Mauritius. This is the route at all times of the year from West Australia.

CALCUTTA to the CAPE.—**May to September or October.**—Southward from Calcutta, crossing the equator in 90° E., thence direct to Rodriguez, and passing southward of Madagascar as from Mauritius, page 36.

November to April, eastward of Ceylon and Diego Garcia, thence direct to Mauritius and southward of Madagascar as from Mauritius, page 36.

BOMBAY to MAURITIUS and on to the CAPE.—**May to September.**—Down the coast, eastward of Maldivh islands, crossing the equator in 75° E., thence direct to Mauritius, or 100 miles to windward if not calling there; thence 100 miles southward of

Madagascar, making the African coast about 200 miles southward of Natal, thence in the strength of the Agulhas current, which passes Algoa bay at about 50 miles distance, and Mossel bay at about 100 miles; thence sight Agulhas light before shaping course for the Cape.

OCTOBER TO APRIL.—From Bombay to the Cape, steer direct to and westward of Comoro islands, thence near the African coast in the strength of the Mozambique and Agulhas currents to the Cape as in opposite season. From Mauritius to the Cape the route is similar to that taken in May to September, but a little southing on leaving Mauritius might be made before shaping course for south end of Madagascar.

ADEN TO THE CAPE.—**MAY TO SEPTEMBER.**—Having passed northward of Sokótra, stand away to the south-eastward, and cross the equator in about 72° E.; thence steaming to the southward through the doldrums and eastward of the Chagos group, whence Mauritius will be fetched on the port tack with the south-east trade; thence to the Cape as from Mauritius, page 36.

OCTOBER TO APRIL.—Direct from Ras Asir, with a favourable wind and current, crossing the equator in 45° E.; thence close westward of Great Comoro and along the African coast in the Mozambique current, as from Zanzibar and Mozambique (*see below*). Little ground would be lost by making the passage *via* Zanzibar.

BOMBAY TO THE CAPE.—**MAY TO SEPTEMBER.**—The route is *via* Mauritius (*see page 37*).

OCTOBER TO APRIL.—Direct, crossing the equator in 53° E., thence westward of Great Comoro, and down the coast with the Mozambique and Agulhas currents, as from Mozambique; *see below*.

ZANZIBAR, MOZAMBIQUE, AND NATAL TO THE CAPE.—**Both seasons.**—Down the coast from Zanzibar, through Mafia channel, keeping close in shore (inside Lazarus bank) until southward of cape Delgado, from which cape the current will be strong and favourable; although somewhat longer than the direct route, there will be less adverse winds and currents, and smoother water in the south-west monsoon period. Vessels bound to the north-west coast of Madagascar should keep the African coast as far as Mozambique port. From Mozambique to Natal and the Cape, keep in the strength of the Mozambique and Agulhas currents to Natal; thence in the strength of the latter current, passing about 50 miles off Algoa bay and 100 miles off Mossel bay; cape Agulhas light should be sighted, whence course may be shaped for the Cape of Good Hope.

OUTWARD (EASTWARD) ROUTES.—SAILING VESSELS.

CAPE to EAST AFRICAN PORTS.—The routes for sailing vessels from the cape of Good Hope to East African ports are much the same as those given for vessels with sail and auxiliary steam power, but a little more easting than that recommended for those vessels might profitably be made before leaving the westerly winds.* The Mozambique channel, or the passage close eastward of Madagascar, may be taken during the south-west monsoon period (April to October); but in the opposite season, only the latter passage. (*See page 29*).

CAPE to BOMBAY.—**April to October.**—Vessels bound from the Cape to the west-coast of Hindustán may, during the south-west monsoon period, take either of the routes mentioned at page 29, through Mozambique channel, or eastward of Madagascar, provided they are certain of reaching their port before mid-October, otherwise they should take the route for the north-east monsoon period, here mentioned. *See West coast of Hindustán pilot.*

November to April.—During the north-east monsoon period, make easting from the Cape to long. 65° E., cross lat. 30° S. in 75° E., lat. 10° S. in 70° E., and the equator in 80° E., thence up the coast of Hindustán.

CAPE to CALCUTTA.—**April to October.**—From the Cape to Calcutta, in south-west monsoon period, make easting from the Cape to long. 60° E., crossing lat. 30° S. in long. 72° E., thence across the equator in 78° E., and direct to Ceylon or Calcutta.

November to April.—During north-east monsoon, make easting to St. Paul's, or a little beyond to 80° E., thence north-eastward, crossing lat. 30° S. in long. 95° E., and equator in 95° or 96° E., thence as near Achi head as the wind permits, and eastward or westward of Nicobar island; the former is to be preferred, as the vessel will have a better chance of fetching up the Bay of Bengal. *See Bay of Bengal pilot.*

HOMEWARD (WESTWARD) ROUTES.—The homeward routes from India, for sailing vessels, during the south-west monsoon period are similar to the routes given for the small-powered steam vessels during the height of that monsoon (*see page 37*), but the equator will probably not be crossed so far to the westward.

During the north-east monsoon the wind is fair and the homeward route is the same as for small-powered steam vessels, as before described.

* *See Admiralty chart of the World showing the auxiliary steam tracks, No. 1078.*

CHAPTER II.

TABLE BAY TO CAPE AGULHAS.

(Between long. $18^{\circ} 20'$ and 20° E.)

VARIATION IN 1889.

| | | | | | | |
|----------------|---|---|---|---|---|------------|
| TABLE BAY - | - | - | - | - | - | 30° 0' W. |
| CAPE AGULHAS - | - | - | - | - | - | 30° 20' W. |

The CAPE PENINSULA is a remarkable promontory, extending about 28 miles north and south, and from 5 to 8 miles in breadth, with a varying height from 3,550 feet at Table mountain, and 3,200 feet at Constantia berg, to but a few feet above the sea between Fish Hook bay on the east and Chapman bay on the west ; which low land, however, is only visible on particular bearings. The neck of land connecting the peninsula on its north-east side with the main, and extending from Table bay to the head of False bay, is low, and about 11 miles across.*

The Cape peninsula is rocky and barren, with a stunted growth of trees here and there ; the fertile valleys, however, in the vicinity of Constantia and Wynberg are pleasing exceptions. From the westward, the peninsula appears high and rugged from Table mountain to within 4 miles of the cape of Good Hope, where the mountain chain terminates at Paulsberg, which stands over the north extreme of Buffals bay, on the east side of the peninsula. From Paulsberg to Cape point the land is elevated and even, with the exception of two peaks at its southern extremity, which at a considerable distance make like a saddle island.

Soundings Westward of the Cape peninsula.—The offing westward of the Cape peninsula has not been thoroughly sounded ; but from what has been done, it appears that at 4 miles from the shore there is no bottom at 40 fathoms, and off the high land north-west of Hout bay there is none at 40 fathoms $1\frac{1}{2}$ miles off

* See the opening paragraph of Chapter I.

shore. From Hout bay to the Cape the water is less deep, the soundings varying from 24 to 10 fathoms, rocky bottom, at from one to 2 miles off shore. At the distance of 5 miles north of the Cape, and abreast of the south Whittle western beacon, 10 fathoms, rock, were obtained at 1½ miles off shore, and the sea breaks on this spot in bad weather. The precaution, therefore, of using the lead when approaching the Cape should never be omitted if doubt exists as to the accuracy of the vessel's position.

TABLE BAY is an indentation on the northern side of the neck of the Cape peninsula, about 4 miles wide at its entrance between Whale rock and Green point, and sufficiently commodious to accommodate a large fleet. The breakwater in course of construction, a large portion of which is now complete, with its transverse arms, and the basin accommodation within, afford shelter for several large vessels. Vessels of 24 feet draught can coal alongside the outer transverse arm. For anchorage, *see page 46**.

Table mountain.—The bay derives its name from Table mountain, a remarkable and gigantic mass of quartzose sandstone, rising to an elevation of 3,550 feet at the south part of the bay immediately over Cape town. The mountain, which rests on a granite base 500 feet above the sea, is level on the top, and falls nearly perpendicularly at the east end, until it joins Devil's peak, which is a rugged peaked mountain, 3,270 feet high, and separated from the former by a gap. On the east side of Table mountain and Devil's peak, lies the low sandy isthmus between Table and False bays. The west end of Table mountain is also nearly perpendicular from its summit to a considerable distance, and is then united by an abrupt declivity with the base of a conical mountain called Lion's head, which is about 2,180 feet high, and is in some places so steep, that it can only be ascended by steps cut in the rock.

From the north side of the Lion's head a rounded ridge extends to the north-east, where it reaches an elevation of 1,150 feet, and is known as Lion's rump, upon which is a signal station.

Blaauwberg (Blue hill), a dark round hill rising to an elevation of 745 feet, may be considered the northern boundary of the approach to Table bay.

**See Admiralty charts:—Table bay to Donkin bay, No. 2,091 : Table bay to cape Agulhas, with plan of Table and Simon's bays No. 2,082 ; plan of Table bay. No. 1,920 ; scale m = 2:8 inches ; and Table bay, breakwater, and docks, No. 123 ; scale m = 30 inches.*

Salt river.—Southward of Blaauwberg, the shore for 2 miles is composed of a number of white sand hills from 100 to 200 feet high, at which distance rocks and breakers extend one-third of a mile off shore ; it then gradually curves to the south-westward for 8 miles, to the mouth of Salt river. The whole of this space is very deceptive to vessels standing into the bay at night or in hazy weather, from the close resemblance the sand bears to the water.

The mouth of Salt river is fordable in summer, but dangerous in winter, when it becomes an extensive quicksand. Another winter mouth of the river lies about 2 miles north-eastward ; this mouth is fronted by foul ground with depths of 3 to 5 fathoms water, to the distance of three-quarters of a mile from the shore, and on which the sea breaks after heavy N.W. gales ; with this exception, the water shoals regularly from 8 fathoms, to the sandy beach between Blaauwberg and Salt river. From Salt river the coast sweeps to the westward and northward, fronting Cape Town, and forming Table bay anchorage.

The Tygerberg hills, 1,357 feet high, and 6 miles in length, extend 5 miles in a north and south direction, within the eastern shore of Table bay. With the exception of Blaauwberg, these are the only elevations in the neighbourhood of Table bay, north of Table mountain.

ROBBEN ISLAND lies about 5 miles northward of Green point, the northern extremity of the Cape peninsula, and, and with its light, forms an admirable landmark for the northern approach to Table bay. It is low, flat, nearly 2 miles in length N.N.E. and S.S.W., with a breadth of one mile. The island is fringed by reefs, which project fully a cable off its western side ; but rocky ground, with from 5 to 11 fathoms, extends W. by N. for the distance of one mile from its western extreme, and on which the sea breaks heavily during strong breezes from S.W. to North. This rocky ground rises suddenly from depths of 25 and 30 fathoms. *See* light, page 44.

The north-east side of the island is free from danger, but the east and south shores are fronted by rocky ground, with irregular soundings varying from 2 to 4 fathoms, and marked by an abundance of seaweed to the distance of 3 to 4 cables.

Landing.—There is a jetty on the south-east side of the island for the convenience of the lunatic establishment, and there is also good landing on the north-east side, in Murray bay.

Whale rock, with a depth of about 6 feet, marked by seaweed, and upon which the sea usually breaks, lies S. by W. $\frac{1}{2}$ W. $1\frac{3}{10}$ miles from the lighthouse on Robben island. Between the rock and Robben island, there is a passage nearly three-quarters of a mile wide, with depths varying from 4 to 7 fathoms, over rocky ground; but this channel should never be attempted by sailing vessels, except in case of emergency, as the currents are sometimes strong and uncertain in their direction about the rock.

Robben anchorage.—On the north-east side of Robben island, there is fair anchorage, sheltered from W.S.W. to N.W. winds. The best position for a large vessel is with Whale rock breaker open eastward of the south point of the island, bearing S.W., and the north extreme of the island N.W. $\frac{1}{2}$ N., in 8 or 9 fathoms water, sandy bottom. Smaller vessels will find excellent shelter nearer the island, in 5 and 6 fathoms. Closer to the shore than this, the ground is rocky. The channel between Blaauwberg beach and Robben island is nearly 4 miles wide, with depths of 7 to 10 fathoms.

CAPE TOWN, the capital of the colony and the seat of government, stands on the western shore of Table bay, between it and the foot of Table mountain, and is well laid out with numerous public buildings, schools, churches, hospitals, and several good squares; in 1887 it contained a population of about 40,000. It is connected with the principal places in the Colony by railway and telegraph, *see page 8*.

Breakwater and docks*—About midway between Mouillé point and Amsterdam battery on the north side of Cape town, a breakwater extends about 1,000 yards in a N.E., and E. by N. (true) direction, to a depth of 40 feet at low water springs*; works are in progress to extend it a further distance of about 150 yards in an E. by N. direction. A coaling jetty 600 feet long, and about the same distance seaward of east jetty, has been built at right angles to the breakwater, which much facilitates the coaling of large steamers; additional wharf accomodation has also been formed between these jetties, with depths from 21 to 26 feet alongside. Several buoys have been placed for the convenience of warping.

* See Admiralty plan of Table bay, breakwater, and docks, No. 123; scale $m = 30$ inches. Authority, Sir John Coode, January 1889.

It is proposed to build a transverse arm 850 feet long, 700 feet seaward of the coaling jetty; also a pier parallel with the breakwater, 1,500 feet long with a cant of 370 feet, having an entrance 240 feet wide between it and the transverse pier from the breakwater. This will, if carried out, enclose a considerable space, with depths from 21 to 32 feet, and afford ample protection from the dangerous northerly gales.

Outer basin.—At the inner end of the breakwater, on the south side, is the outer basin, 840 feet long, 260 to 380 feet broad, with an entrance 200 feet wide, in which there is a depth of nearly 21 feet. The depth at low-water springs close up to the east jetty is 18 feet, gradually decreasing to 12 and 9 feet at the wharves on the western side of the basin.

The Alfred docks or inner basin lies close southward of and within the outer basin. It is 1,000 feet long, 400 to 450 feet broad for two-thirds of its length from the north quay, the remaining portion being 250 feet broad ; the width of the entrance is from 100 to 120 feet with a depth of nearly 21 feet at low water springs. Inside, the basin has a depth of 24 feet over the northern part, decreasing to 19 and 20 in the southern. Extensive warehouses and sheds, with cranes, &c., are erected around the basin, and a large smithy and factory are available for engine repairs. The basins are connected by a railway with Cape town.

Vessels entering the basins, with the privilege of remaining therein for 30 days, including the day of arrival and departure, are charged at the rate of sixpence per each registered ton ; and for every week or portion of a week after the above period, at the rate of one penny per registered ton. Vessels wishing to enter must first communicate with the harbour master.

The number of vessels entering annually amount to about 900, registering about 900,000 tons.

Dry dock.—The Robinson dry dock lies at the north-west angle of the inner basin ; it is 530 feet long overall, 500 feet on the blocks, 90 feet wide at the coping level, and 68 feet wide at the entrance, with a depth on blocks of $22\frac{1}{2}$ feet at the upper end, 25 feet at the lower end, and $24\frac{1}{2}$ feet on sill at high water ordinary spring tides, and is capable of docking vessels of 23 feet draught. Vessels of heavier draught can lighten at the breakwater jetty.

The length of the dock can be increased by $11\frac{1}{4}$ feet, by placing the caisson against the stop, instead of the outer groove. The caisson can also be placed in an inner groove, thus forming a dry dock $274\frac{1}{2}$ feet in length, leaving the outer portion for use as a wet dock.

The patent slip at the south end of the inner basin, is capable of taking a vessel of 1,000 tons. See repairs, page 46.

Communication.—See page 8.

LIGHTS.—On Minto hill, the highest and southermost elevation on Robben island, is a lighthouse 60 feet high, of a cylindrical

form, painted white. It exhibits, at an elevation of 154 feet above high water, a *fixed* white light, which in clear weather should be seen from a distance of 19 miles.

Green point.—A lighthouse stands upon Green point, the westward extreme of Table bay, at 400 yards from the low water line. It is a rectangular building 52 feet high, and exhibits, at 65 feet above the sea, a white *flashing* light every *ten seconds*, and should be visible in clear weather from a distance of 13 miles.

Mouillé point.—On Mouillé point, situated about half a mile eastward of Green point, and at 100 yards within low-water mark, is a lighthouse, 30 feet high, painted in alternate red and white bands, from which is exhibited at an elevation of 44 feet above the sea, a *fixed red* light of the fourth order, which should be visible in clear weather from a distance of about 10 miles.

Breakwater.—Near the extremity of the breakwater works in progress, on a travelling platform, a *fixed green* light is exhibited at an elevation of 25 feet above high water. Vessels are recommended to pass well to the eastward of the light, as in rough weather it stands further in from the end of the breakwater.

A small *fixed green* light is exhibited during northerly gales, from a position a little to the southward of the inner part of Prince Alfred wharf (near the castle).

TIME SIGNAL.—A ball is dropped from a staff in the Alfred docks, 36 feet above the ground and 47 feet above high water (by electricity from the Cape observatory), at noon, Cape mean time, corresponding to 22h. 46m. 5·3s., Greenwich mean time.

A gun is fired from Imhoff battery (by electricity from the Cape observatory), at 1h. 0m. 0s., Cape mean time, corresponding to 23h. 46m. 5·3s., Greenwich mean time.

The Cape observatory is situated in lat. $33^{\circ} 56' 3''$ S., long. $18^{\circ} 28' 40''$ E.

Signal Station.—There is a signal station on the Lion's rump, west side of Table bay. Port signals, *see page 49*.

SUPPLIES of all sorts can be obtained at Cape town. Water tanks for the convenience of shipping will be brought alongside at a moderate charge. Water is also laid on to the coaling jetty.

Tugs.—There are three or more tugs available at the port.

Coal is to be obtained in abundance at the coaling jetty, and there is a contract for coaling men-of-war. It is put on board at

the rate of 30 to 40 tons an hour. In the summer, vessels going alongside have to drop an anchor and swing with their head south-east, then haul alongside; in the winter no anchor is required, vessels then lie with their heads to the north-westward; the harbour master invariably comes off and berths vessels.

Repairs to engines and boilers of all classes of vessels are undertaken by the various firms of engineers. There are no heavy forging facilities, but shafts of 40 feet in length and 18 inches in diameter can be turned, cylinders of 36 inches diameter bored, and castings of 3 tons made. There are also several steam-hammers of 15 cwt. and less, and 2 cranes capable of lifting 10 tons weight, under one of which there is a depth at the wharf of 24 feet at low water springs.

ANCHORAGE.—There is good anchorage for large vessels within, and partly sheltered by the breakwater, in 6 fathoms, with Amsterdam battery bearing W.S.W. Most vessels now go into the basin or lie at the breakwater jetties. The bay is not considered safe between April and October, but the breakwater works in progress are daily adding to its security.

Vessels should moor with long scopes of cable. The best ground tackle is required in the winter season when north-west and northerly winds prevail, and during gales, precautions should be taken to prevent surging ahead and slackening the cables between the gusts. It is from want of this precaution that most cases of parting occur.

Vessels touching for water and other supplies may ride at single anchor, but it is particularly recommended to veer to 70 or 80 fathoms of cable, as the chance of fouling or starting the anchor or breaking the chain will thereby be much lessened.

Two sets of moorings are laid down inside the breakwater; the northern set is for large vessels, and the southern for small. *See* port signals, page 49.

Tides.—It is high water, full and change, in Table bay at 2h. 40m.; springs rise 5 feet, neaps $3\frac{1}{2}$ feet. The duration of slack at high water varies considerably, and greatly depends on the prevailing wind; the water is never stationary more than 30 minutes, and frequently it begins to fall immediately on reaching high water. There is no sensible stream of tide, either in the bay or on the adjacent coast. The time of high water and its rise is nearly the same at Simons bay, and all the bays along the coast from the cape of Good Hope to cape Agulhas.

Current.—A current varying in strength from half a knot to 2 or 3 knots, sets to the northward past Table bay and Robben island, but during the winter months, when N.W. winds prevail, a current

sets into Table bay from the N.N.W., and impinging on the south-east shore of the bay, about Salt river, divides into two streams, the one setting northward along the coast and out between Robben island and the main land at Blaauwberg, while the other takes a westerly course as far as Cape town castle, then northerly, sweeping the south-west shore of the bay, and carrying away loose soil from the south sides of the jetties and projecting rocky points.

During the summer season it has been observed, particularly during south-easters, that a gentle stream sets round Mouillé point south south-eastward into the bay, and out by the Blaauwberg beach, as in the winter. The rocks about the beach from Green point to Amsterdam battery are bare, and always free from sand, but in the depth of the bay, from the Castle to Salt river, vast quantities of sand and sea weed are removed from the beach by the drawback of the rollers, and carried away by the current, leaving the sea-shore a platform of solid rock, which is again covered up to the depth of 2 to 3 feet during the summer months.

DIRECTIONS.—No special directions are required for steam vessels entering or leaving Table bay in the daytime. Sailing vessels during the Cape summer months should shorten sail before hauling in for Green point, as south-easters blow hard at times on opening the bay.

If it is found to be blowing hard after passing Mouillé point, they may with advantage anchor in 10 or 12 fathoms, where they will be in a good position for dropping into the inner anchorage on the following morning, as the wind invariably falls light there during the night, although the S.E. wind may continue to blow hard on the east side of the bay.

If compelled by a south-easter to bear up from Green point, in order to seek shelter under Robben island, take care to avoid the Whale rock, and bring up on the north-east side of that island (page 43), under easy sail. With ordinary precaution, there is little probability of losing an anchor in bringing up in this place of shelter; but should she part in trying to bring up during a south-easter, there is an open sea to leeward. Tugs are available.

During daylight vessels may round Green and Mouillé points at half a mile distant, in not less than 10 fathoms water, but this distance must not be judged by the eye, as the points are low and deceptive; thence to the anchorage, passing the breakwater at a prudent distance, but giving it a wide berth in bad weather.

There can be no excuse for neglecting the lead in entering Table bay, the greatest depth of water in mid-channel between Green point and the Whale rock being 20 fathoms, and from which, towards the beach, the soundings gradually decrease. The bottom is foul and rocky to the north-west of a line joining the Lion's head and rump, but east of this it is clear, and a vessel may, if necessary, anchor in any part in from 8 to 10 fathoms, sandy bottom.

Caution.—From neglecting the precaution of using the lead, vessels have sailed on to Green and Mouillé points without seeing land, whilst their masts were seen over a fog from the elevated ground at the foot of Lion's rump. The fogs that obscure the lights are frequently confined to the low ground in the vicinity of Green and Mouillé points, extending upwards only 100 to 150 feet. Under these circumstances it is advisable to send a mast-head man aloft, who will probably see land when it is invisible from the deck.

At night.—Vessels bound for Table bay from the southward should not shut in Cape point light with the land at Slangkop point until the *fixed* white light on Robben island (which will be seen before the *flashing* white light on Green point) bears N.E. $\frac{1}{2}$ E., when they may steer for it; and when Green point light bears East, an E.N.E. course may be followed until the *fixed red* light on Mouillé point bears S.E. by S. (This route will clear Vulcan rock and all dangers between it and Table bay.)

The course may now be altered to S.E. by E. $\frac{1}{2}$ E., which will lead one mile northward of Mouillé point light, and within this distance no stranger should round the point at night. When Mouillé point light bears S.S.W., a course about S. by E. $\frac{1}{2}$ E. may be steered for the anchorage, bearing in mind not to approach the green light near the end of the breakwater, too close; when past it a vessel may anchor in 6 fathoms water, partly sheltered by the breakwater. Small vessels may get closer to the breakwater in 4 to 6 fathoms.

Vessels bound to Table bay from the northward should pass about 2 miles westward of Robben island light, and steer for Green point light bearing S. by E. (which will lead nearly 2 miles westward of Whale rock) until Robben island light bears N.E., then steer S.E.; and when Mouillé point light bears S.S.W. proceed as before.

Entering Table bay from the northward, between Robben island and the main, keep Mouillé point light S.S.W. $\frac{1}{2}$ W. until past Robben island, with the lead going. When the water deepens to 11 or 12 fathoms, or Robben island light bears N.N.W., steer about S. by W.

for the anchorage. It is, however, not prudent for a sailing vessel to enter the bay by this channel on account of the northerly current.

Working in.—In working between Robben island and the main, the soundings shoal regularly towards the island ; but when approaching the main, it is necessary to tack at the first cast of 8 fathoms.

In standing to the eastward when southward of Whale rock, avoid bringing Robben island light westward of N.N.W., and when approaching the anchorage, not westward of N. by W. ; this will prevent accidents from the low Blaauwberg beach, on the eastern shore of the bay, which is very deceptive at night. Little, if anything, can be lost in thus beating in, as a constant northerly current sets out between Robben island and the main land ; added to which the wind blows with greater violence from the S.E. on the east side of the bay than it does more to the westward, though not in such sudden and violent gusts.

Strangers are not recommended to beat into Table bay at night, especially in squally or thick weather, but to stand off and on until daylight, at a prudent distance to the westward of Green point.

Leaving Table bay.—Vessels leaving Table bay and bound to the northward, should pass between Robben island and the mainland. An almost continuous current sets to the northward through this channel, and during the summer months a fresh south-easter frequently blows, whilst a few miles to the westward of the island the wind is light and baffling, or fails altogether. Vessels bound to the southward should reverse the directions previously given for entering the bay.

PORT SIGNALS.—The following signals will be shown when, from local experience and good barometers, a severe gale may be expected. It is strongly recommended that they may be promptly observed when made from the port office ; and any neglect in the observance of them will be reported to the agents for Lloyd's, as also the owners of the vessels disregarding the signals. See also page 13, for weather signals.

White pierced blue, over union-jack.—Clear hawse, and prepare to veer cable.

Union-jack over white pierced blue.—Veer to a whole cable, and see the third anchor clear.

Blue, white, blue, horizontal, over union-jack.—Down top-gallant yards and masts, and point yards to the wind, and see everything clear for working the ship as far as practicable.

Union-jack over No. 3, white and red, vertical.—Shorten in cable to same scope as when first moored.

When it is considered necessary to make any of the above signals, it is strongly recommended that all commanders immediately repair on board their respective vessels, and that the above signals may be answered by hoisting the answering pendant, or the ensign at the peak end or any of the mast heads.

The above signals will be repeated from the Lion's rump signal station.

Vessels can make their wishes known to their agents in blowing weather, through the port office, by the International Code of Signals, and any assistance required will be strictly attended to, as far as practicable.

Should vessels part from their anchors during a northerly gale and cannot work out, they are strongly recommended to run for the *green* light, shown on the shore near the castle, and beach close to the southward of the Castle ditch, the crews remaining by their vessels, by which means little or no danger of life is to be apprehended. It is also recommended that, in the case of such vessels taking the ground, any after sail that may have been set in running for the beach should immediately be taken in, keeping the foresail or fore-topsail set, as the case may be, until the vessel is firmly grounded.

The following signals may be made from the most convenient point of the shore to vessels that may be stranded.

In day-time, a number will be shown, white upon a black ground. At night, the number will be shown transparent.

No. 1. You are earnestly requested to remain on board until assistance is sent; there is no danger to life.

No. 2. Send a line on shore by cask, and look out for line from rocket or mortar.

No. 3.—Secure the rope; bend a warp or hawser to it, for us to haul it on shore for the boat, or for us to send you a stout rope, to be made fast to some firm part of the wreck, that we may haul off a boat for bringing you on shore.

No. 4. Life-boat will communicate at low water, or as soon as practicable.

No. 5. Have good long lines ready for life-boat, and prepare to leave your vessel ; no baggage will be allowed in the life-boat.

Answering Signals.—By Day.—A man will stand on the most conspicuous part of the vessel, and wave his hat three times over his head.

By Night.—A light will be shown over the side of the vessel where best seen.

Climate and Rainfall. See page 18.

WINDS.—During Summer (October to April) the prevailing winds in Table bay are from the south-east ; these, although known by the name of south-easters, blow at about S. by E., frequently with violence during the summer season, and more or less in every season of the year, generally bringing settled weather.*

Regular sea breezes from south-west and west prevail in the mornings, and continue until noon or longer, succeeded by the south-east winds from the land.

North-westerly gales are experienced here in every season of the year, but as a rule these do not blow home between November and May, during which months the bay is considered safe.

The ordinary indications of a south-easter are well marked—a high barometer, a clear sky, and the cloud cap on Table mountain, known as the “table cloth.” During the hardest south-easters, the Blue Berg and Hottentot mountains are obscured by mist, and often after the “cloth” has disappeared the gale continues until these mountain ranges are clear. In autumn, during south-east gales, the top of Table mountain is sometimes quite clear, such a gale is called a “blind south-easter,” but the Blue Berg and Hottentot Holland ranges are covered in mist 24 hours or more before the breeze springs up, by which sign it may thus be confidently foretold ; moreover, the wind does not die away until these mountains are clear.

In autumn, the south-easters blow at times with great fury over Table and Devil mountains, and through the gap between them, driving the white clouds in rolling fleeces like wool over the perpendicular sides of the mountain. On those occasions, vessels not well moored are liable to drive, and bring both anchors ahead. There have been instances of vessels driven from Table bay by these south-easters with all their anchors down, and not regaining the anchorage for five or six days. Sometimes there occurs a fall of the barometer whilst such a gale is blowing, when a change of wind to north may be

* See also winds and weather off the Cape Colony, p. 9.

expected ; if this does not come, a black south-easter follows. Sometimes a black south-easter follows a sudden change of wind from the north.*

The so-called "black south-easter" is distinguished from the regular south-easter by the nimbus or rain tint of the cloud on Table mountain. It is frequently accompanied by light rain and cold weather. Black south-easters are very destructive to the vines, and to young vegetation, their appearance the next day being as if withered by frost.

During Winter (April to October) north-westerly winds prevail, and the bay is not safe. A mountainous sea is thrown into the bay by some of these gales, and before the breakwater and docks were built there was not the slightest shelter. The breakwater works are still in progress. *See page 43.*

Westerly and S.W. winds blow strong, and are often accompanied with fogs, rain, and cloudy weather, and with the south-west wind hail-storms are frequent ; but the north-west winds are most violent in those months, often blowing in severe storms from north, or N.N.W. for several days, with a cloudy sky, and sometimes accompanied with rain. These north-west gales are preceded by a gradually falling barometer, with the wind at N.N.E, the temperature increasing to an unusual height 36 hours or more before their advent, and with cirrus clouds in the north-west. Table mountain and the adjacent high land becomes enveloped in clouds. The duration of a north-wester is from 2 to 10 days. North-east winds are less frequent than any other, and never continue long.

In calm weather low fogs occasionally occur, particularly in autumn and winter, the tops of the mountains and high hills being visible above the fog, which is afterwards dispersed by the heat of the sun.

WEST COAST OF THE CAPE PENINSULA.†—The distance from Green point to the southern extremity of the cape of Good Hope is about 32 miles, the intervening coast line being rugged and indented, whilst the outline of the country is also broken and irregular. From Green point to Duyker point the distance is about 9½ miles in a S.W. by W. direction, and along this portion of the coast the water is deep at one mile off shore, but within that distance

* Extract from report on gales in ocean district adjacent to cape of Good Hope Capt. Toynbee, F.R.A.S., 1882. *See also winds off the Cape, page 9.*

† See Admiralty chart :—Cape of Good Hope and False bay, No.636. For a description of the Peninsula and soundings off, *see page 40.*

there are numerous off-lying rocks, and patches of rocky reef. Vessels navigating in this locality should maintain an offing of 2 or 3 miles, for inside these limits the wind is generally light and baffling from the close proximity of the high land.

From the western end of Table mountain, a high serrated ridge of mountains, named the Twelve Apostles, extends in a south-west direction, towards Hout bay. They present a steep precipitous face to seaward, and are terminated by a remarkable conical hill, similar in appearance to the Lions head, though not so high, and having at its southern slope a very conspicuous white sand patch. To the southward of this, about $1\frac{1}{2}$ miles distant, rises Suther peak, a lofty rugged hill, which is divided by a saddle ridge from Captain peak, a remarkable hill of considerably less elevation, overhanging, and to the westward of Hout bay.

Lions Paws.—Between $2\frac{1}{2}$ and 3 miles W.S.W. from Green point lighthouse, and just to the northward of Camps bay are two clusters of rocks, 4 cables apart, known as the North and South Lions Paws ; these rocks are awash, but with 7 and 9 fathoms close-to, and they lie one-half and one-third of a mile off shore, the Lions head bearing S.E. and E.S.E. from them respectively. Robben island lighthouse bearing N.E. $\frac{1}{4}$ N., leads one mile westward of the outer danger ; and Green point lighthouse bearing East, leads half a mile northward of the Paws. Besides the Lions Paws there are several other straggling rocks along the shore, both north and southward.

Duyker point, is rocky, forming the western extremity of the Cape peninsula. At half a mile north-eastward of Duyker point, is the Oude Schep, a dry ledge of rocks extending about one-third of a mile off shore, with a detached rock outside it. There is no bottom with 40 fathoms, at $1\frac{1}{2}$ miles off shore, and Green point light bearing E. by N. $\frac{1}{4}$ N., clears the point about that distance.

Vulcan rock, the central and highest of a cluster, about 150 yards in extent, is awash at high water, and has from 11 to 20 fathoms from one to two cables distant all-round. It lies nearly three-quarters of a mile off shore, with Duyker point N.N.E. $\frac{1}{4}$ E., distant $1\frac{1}{2}$ miles. A line of breakers extends 3 or 4 cables from Duyker island (a low flat rock close to the shore, abreast Vulcan rock) to a mid-channel position. Vessels should pass outside Vulcan rock.

HOUT BAY is formed by a deep indentation in the high coast line, at $2\frac{1}{2}$ miles south-eastward of Duyker point, and is about one

mile in depth. It affords anchorage in from 12 to 5 fathoms, sand, but is open to south-westerly winds.*

This bay is scarcely ever visited, and yet it possesses advantages as a place of shelter, especially for steamers; the only objection to it for sailing vessels, is one that is applicable to all harbours surrounded by high land, namely, variable winds and strong gusts from the shore.

The coast on either side of the entrance is high and rugged, particularly on the eastern side, which is quite inaccessible. Here the hills, rising precipitously from the coast, are broken by a succession of ravines, which renders walking around the shore impracticable. There is no landing on this side.

On the western side of the bay is York point and battery in ruins, with rocks extending about one cable off; within the point there is good landing even in S.W. gales; on the opposite side is Blockhouse point. The head of the bay is low and marshy, with a stream of running water.

Anchorage.—Constantia berg, 3,200 feet high, seen over the high cliffs on the eastern side of the bay, bearing E. $\frac{1}{2}$ S., leads directly into the bay. A line of foam, giving a false appearance of danger, is frequently seen across the entrance. It is advisable to anchor as close in, round York point, as the vessel's draught will admit. It is said that with an inside berth a vessel may lie safely in all weather, and that the port is capable of affording shelter to six or eight vessels of ordinary size in all winds, if properly moored, and on the whole is a better harbour than would appear at first sight. The S.W. wind is said not to blow home against the high land.

Supplies.—Fresh water is abundant at Hout bay, but there are no conveniences for getting it on board. Provisions may easily be obtained from Cape town, and fish of good quality is abundant.

COAST.—Slang-kop point.—Above Chapman point, which is common to Hout and Chapman bays, is Chapman peak, of dark appearance and considerable elevation. From Chapman point to Slang-kop point the distance is about $3\frac{1}{2}$ miles in a south-west direction; the intervening shore falling back into the curved sandy beach forming Chapman bay, which is fringed with rocks, and being exposed to north-westerly winds, should not on any account be used as an anchorage. A sunken reef extends about 3 cables off Chapman point.†

* See Admiralty plan of Hout bay, No. 635; scale, $m=2\cdot1$ inches.

† See Admiralty chart Cape of Good Hope and False bay, No. 636.

Immediately at the back of Slang-kop point the cliffs rise 300 or 400 feet above the sea ; but the point itself is low and rocky, with a ledge of sunken reefs fringing the shore, at the distance of one mile. (This coast has not been sounded out.) The sea breaks over this reef in westerly winds when there is usually a heavy swell. From Slang-kop point to the Kromme river, a distance of $5\frac{1}{2}$ miles in a southerly direction, the coast becomes higher and rugged ; thence to Olifants Bosh point and the cape of Good Hope it is elevated from 300 to 400 feet above the sea, and is tolerably regular in outline.

Albatross rock,* on which the *Kafir* probably struck, is 400 yards long, less than 6 feet water, with 7 to 13 fathoms around, and 5 fathoms between it and Olifants Bosh point ; its outer part lies with Olifants Bosh point bearing East, distant 6 cables.

About one mile northward of Albatross rock, and 4 cables from the shore, a detached rocky patch of small extent, with less than 6 feet water, also exists.

One mile westward of Albatross rock the soundings increase to 27 and 30 fathoms, and nearly the same depths are found at the distance of 2 miles in the same direction.

In proceeding northward, keep the Cape light in sight (eastward of S.S.E. $\frac{1}{4}$ E.) until Duyker point is open of Slang-kop point.

A rocky bank, with irregular depths of 10 to 16 fathoms, and one mile in extent north and south, fronts the point situated about 2 miles southward of Olifants Bosh point, to the distance of $2\frac{1}{2}$ miles.

From the shoalest part of the bank the cape of Good Hope light-house bears S.E. $\frac{1}{2}$ S., 6 miles, and the point abreast, E. $\frac{1}{2}$ S., distant $1\frac{1}{2}$ miles.

This rocky bank lies somewhat in the fairway for vessels passing round the coast to and from Table bay, and as in heavy southerly gales a continuous line of breakers has been observed to extend between this ledge and the shore, vessels should not approach this part of the coast in bad weather.

CAPE OF GOOD HOPE.—The southern extremity of the Cape peninsula is a high precipitous cliff, surmounted by two peaks distant from each other 1,800 yards in a north-west and south-east

* The Union Mail steamer *Kafir* was reported to have struck on a sunken danger 3 miles off Olifants Bosh point ; a close examination of the locality was made by Commander W. J. Wharton, H.M. Surveying vessel *Fawn*, 1878, who found no indication of sunken rocks beyond 6 cables from the point.

direction. The one to the north-west, 880 feet high, is known as Vasco da Gama peak; and on the other, 800 feet high, near the pitch of the Cape, stands the lighthouse.

LIGHT.—From a lighthouse, 30 feet high and painted white, on Cape point, is exhibited, at an elevation of 816 feet, a *revolving* white light showing a bright face for the space of *twelve seconds every minute*. It is visible all round, except where cut off by the land between the bearings of S.S.W. and S. $\frac{1}{2}$ E., and between S.S.E. $\frac{1}{2}$ E. and S.S.E. $\frac{3}{4}$ E., and in clear weather should be seen from a distance of about 36 miles. Its position is in lat. $34^{\circ} 21\frac{1}{4}'$ S., long. $18^{\circ} 29\frac{1}{2}'$ E.

Caution is necessary when approaching this light, as from its great elevation it is frequently obscured by mist, although at the same time clear round the horizon.

A Signal Station has been established on Cape point close to the lighthouse; and passing vessels showing their number, will be duly reported.

Reefs off the Cape.—**South-west reefs**, which are generally breaking, appear to be the outer projections of a rocky ledge, extending one mile from cape Maclear, the south-west extreme of the cape of Good Hope. From the outer patches, of 5 fathoms, the lighthouse bears E. $\frac{1}{4}$ N. $1\frac{3}{4}$ miles. Under no circumstances should vessels attempt to pass inside these patches, and coming from the northward Slang-kop point should be kept in sight until Cape point bears E. by N.

Bellows rock, from which the lighthouse on Cape point bears N.N.E. $\frac{3}{4}$ E. distant $2\frac{1}{6}$ miles, is awash at high water, and always breaks. The water is deep close round this rock except on its south-west side, where there are sunken rocks about a cable distant, on which the sea does not always break.

Anvil rock has a depth of 6 feet at low water springs, and lies on the eastern end of a 3 fathoms rocky patch about 2 cables in length and with Cape point bearing N.N.W. $\frac{1}{2}$ W., distant $1\frac{1}{4}$ miles. It breaks only at low water with a heavy swell, and the depths to seaward are from 14 to 18 fathoms close-to. Vasco de Gama peak, open northward of the lighthouse, leads northward of Anvil rock, and Constantia Berg well in sight leads eastward.

Dias rock, about 8 feet high, is connected with Cape point by a sunken reef. The water is deep at 2 cables seaward of the rock.

Three pinnacle rocks with $4\frac{1}{2}$ and 5 fathoms lie between Dias and Anvil rock, rendering the passage between them unavailable for vessels of large draught, or even for small vessels in bad weather.

DIRECTIONS.—Making the Cape from the Westward.*—Vessels approaching the Cape of Good Hope from the westward may, if the weather be clear, make Cape point light at the distance of about 36 miles, unless it should happen to bear between S.S.E. $\frac{1}{2}$ E. and S.S.E. $\frac{3}{4}$ E. (or behind Vasco de Gama peak). Caution is therefore necessary not to continue a course between these bearings when making the land at night, or in hazy weather. Should a vessel be near the coast at night, and the land not visible, she should be kept to the south-westward until her position is ascertained.

As the wind seldom, if ever, blows from the east or north-east (*i.e.*, directly off the peninsula), sailing vessels bound either for Table bay or round the Cape of Good Hope, should ensure a weatherly position to the northward or southward, according to the season of the year. Those for Simons bay have been detained many days by south-easters off the Lions head and Hout bay, in consequence of their making the land too far to the northward during the summer season. The same winds would have been fair for them had they been 30 miles farther south. On the other hand a vessel bound for Table bay in the winter season will find it difficult to make her port from a position off Cape point, during the continuance of North and N.W. winds, notwithstanding the general prevalence of a N.N.W. current.

Rounding the Cape from the Westward.—Vessels rounding the Cape from the westward, and bound into False bay, should pass about half a mile southward of Bellows rock (which is always visible by the breakers), thence steer East until Constantia Berg is well in sight, bearing N. $\frac{3}{4}$ E., or Vasco de Gama peak opens eastward of the lighthouse hill, either of which marks lead eastward of Anvil rock.*

Vessels proceeding to the eastward along the coast, having passed the Cape at a prudent distance, should take careful bearings of the cape of Good Hope light as long as it is in sight, and make every allowance for a possible easterly on-shore set, so as to avoid the dangerous neighbourhood of the Birkenhead rock, page 69. Cape Agulhas light is not visible when bearing southward of S.E. by E.†

* Directions for False and Simons bays, *see* p. 66; Table bay p. 47.

† Passages to the cape of Good Hope, from England, west coast of Africa, &c., will be found in the African Pilot, part I; and from the Cape to East African ports, &c., at pp. 26–39 of this work.

Steam vessels bound into Simons bay often pass inside the Bellows and Anvil rocks, but the discovery of the pinnacle rocks, mentioned in page 57, makes it advisable for large vessels to pass seaward of the Anvil. Vessels taking the inside route, when nearing cape Maclear, must not bring Bellows rock to bear southward of S.E. $\frac{1}{2}$ S., until Dias rock bears E. $\frac{1}{4}$ N., or until cape Maclear is midway between Vasco de Gama peak and a gap which separates the lighthouse from that peak, which will lead clear of South-west reefs; then steer to pass from $1\frac{1}{2}$ to 2 cables southward of Dias rock.

Beaching.—There is a small sandy cove between the lighthouse and cape Maclear, in which vessels in a sinking state may be beached in greater safety than on any other part of the adjacent sea-coast.

Rounding the Cape from the Eastward.—When Cape point light is in sight, vessels in standing in towards the land, should be guided by frequent bearings; at the greatest range of the light its bearings will give an idea of the vessel's position with reference to Danger point, which with the rocks off it should be carefully avoided, but when to the westward of Danger point, the light should not be brought to bear more westward than N.W. $\frac{1}{4}$ W., which will clear all danger off Mudge point and cape Hangklip. As cape Hangklip, and the narrow neck of land which connects it to the shore, is very low, great caution is necessary in passing it in hazy weather.

If bound for Table bay from the eastward, vessels, after rounding the cape of Good Hope* and the coast northward to Slangkop point, at the distance of about 5 miles, should not shut in Cape point light with Slangkop point, until Robben island light bears N.E. $\frac{1}{2}$ E., or the light on Green point becomes visible, which will be on an E. by N. $\frac{1}{4}$ N. bearing. This latter bearing leads about three miles westward of Vulcan rock. See directions at page 47.

The precaution of using the lead when approaching the cape of Good Hope should never be omitted.

FALSE BAY.†—The entrance to False bay lies between the cape of Good Hope and cape Hangklip, about 16 miles apart. Within these points, the bay extends to the northward about 18 miles. There are several dangers in it, but the middle and eastern sides are clear, though the bottom is foul and generally unfit for anchorage. The

* The south Whittle beacon (black, with staff and ball) situated on a lower hill about 3 miles northward of Cape lighthouse, is often visible when the lighthouse is enveloped in mist, and is a good mark for recognizing the locality.—ED.

See Admiralty chart:—The cape of Good Hope and False bay, No. 636.

general depth varies from 46 fathoms at its entrance to 20 fathoms about 5 miles from its head, whence it gradually shoals to the breakers, which break in from 4 to 5 fathoms about half a mile off the beach. At the entrance of the bay there is a rocky bank, on which the least water is 13 fathoms, and its north-west end lies with Cape point lighthouse bearing N.N.W. $\frac{1}{3}$ W. distant 5 miles.

Whittle rock, with 7 feet water, is about 6 feet in diameter, and but seldom breaks. It rises on the south side of a rocky patch nearly one mile in circumference, upon which the depths vary from 7 to 10 fathoms. It lies with Cape point lighthouse bearing S.W. by W. $\frac{1}{2}$ W. distant $7\frac{1}{2}$ miles, and the lighthouse on the Roman rocks N.N.W. distant $6\frac{1}{2}$ miles.

Clearing Marks.—Beacons.—A beacon, 35 feet high, and 56 feet above high water, painted white with a red band in the centre, stands on a flat-topped rock, near Oatland point, and 1,700 yards from an inner white beacon, with staff and ball, on the shoulder of the hill beneath Simons berg. From the Whittle rock, these two beacons, as well as a large whitewashed patch on the hill north-west of Simons town, are in line N.W. by N.; as are also the black and white beacons, each with staff and ball, standing on the land over Buffals bay, bearing W. $\frac{1}{4}$ S.; consequently, if these respective beacons are kept open of one another the Whittle rock will be cleared.

Also Chapman peak, well open to the westward of Elsey peak N. by W. $\frac{1}{4}$ W. leads 4 cables westward of the Whittle; and Roman rocks lighthouse, in line with Elsey peak N. $\frac{1}{4}$ W. leads midway between Whittle rock and Miller point.

West shore of False bay.—Buffals bay, on the western shore of False bay, and 2 miles northward of Cape point, is a small indentation in the coast line, marked by a white sand patch. On the ridge of hills behind the bay is a black beacon, which shows out clearly as a mark for the Whittle rock. A white beacon for the same purpose also stands near the sea, just to the northward of the bay. The depth of water is 4 or 5 fathoms near the shore, and in a north-west breeze a vessel may anchor off it in 8 to 20 fathoms, sand, if unable to beat to windward; this is preferable to going to sea, and if a south-easter comes on, a vessel will have room to weigh, cast, and run up to Simons bay, if anchored in the greater depth. There is a fishing establishment and a landing place in the bay.

Between Buffals bay and Smithwinkle bay, $3\frac{1}{2}$ miles northward, the shore is overlooked by four sharp peaks. Off both points of Smithwinkle bay, rocks, some of which are above water, project one-third of a mile from the shore; Batsata rock, 8 feet high, is the highest of those off the southern point.

Rockland point, situated about $7\frac{1}{2}$ miles northward of Cape point, is the most prominent point between Cape point and Simons bay.

The point slopes off to a ledge of dry rocks, beyond which at 2 cables distance, south-eastward, there is an isolated rock 9 feet high, named Bakkoven, which has 11 fathoms close-to; Castle rock, lying 3 cables southward of Bakkoven, dries only at low water.

At $1\frac{1}{2}$ miles northward of Rockland point, is Oatland point, with a few rocks off it, on one of which is a beacon for the Whittle rock, previously described. Between these points sunken rocks extend from 3 to 5 cables off.

Noahs Ark is a flat-topped rock, in shape resembling a barn, about 100 feet long by 30 feet high, lying 3 cables off shore, and about a mile northward of Oatland point. Beyond the distance of 50 yards, the depths are from 6 to 7 fathoms.*

Phœnix rock.—For a distance of $3\frac{1}{2}$ cables in a N.N.W. direction from Noahs Ark, the ground is shallow and foul, terminating with Phœnix rock, which has but 3 feet over it. A red buoy with staff, and the word Rock painted on its flag, lies off the north side of Phœnix rock. Nimrod rock, with 8 feet water, lies nearly midway between Noahs ark and Phœnix rock.

Maidstone rock, with 22 feet at low-water springs, lies S.E. $\frac{1}{2}$ E. 2 cables from the south-west end of Noahs Ark. The base of this rock is about 20 feet in diameter, rising to a sharp peak the summit of which is so small that it is difficult to keep the lead on it. The marks for it are, the south-west end of Noahs Ark on with the north corner of mount Curtis garden wall, N.W. $\frac{1}{2}$ W.; cottage, and the Roman rocks a sail's breadth open eastward of the foot of Muizenberg.

There is also a small patch of 29 feet, which is steep-to on all sides, lying one cable S.S.E. $\frac{1}{2}$ E. from the Maidstone rock.

Roman rocks are a cluster, occupying a space of about three-quarters of a cable, one of the rocks, on which a lighthouse is

* See Admiralty chart, Table bay to cape Agulhas, with plan of Simons bay, No. 2,082; and plan of Simons bay, No. 1,849; scale, $m=8$ inches.

built, being above water, the rest are awash, and the whole surrounded by foul ground. *See* light, p. 62.

Castor rock, with 15 feet water, is detached from the Roman rocks cluster, and lies N.N.E. $\frac{1}{4}$ E. distant 2 cables from the light tower. A red buoy with staff, and the word Rock painted on its flag, is moored one-third of a cable N.E. of the rock. Between the rock and the lighthouse there are patches of 19 and 24 feet.

Seal island is a low rocky islet, two cables long north and south, and one cable wide. It lies E. $\frac{1}{2}$ S. distant $6\frac{1}{4}$ miles from the Roman rocks lighthouse, and is surrounded by sunken rocks, upon which the sea usually breaks. Landing is difficult except in very smooth water. It is the resort of penguins, whose eggs may be collected in considerable numbers at the proper season.

York shoal, the nearest part of which lies S. $\frac{1}{2}$ E. one mile from Seal island, is a rocky patch with from one to $4\frac{1}{2}$ fathoms, about 4 cables long and $1\frac{1}{2}$ cables wide. The sea is generally breaking on it.

East shoal has depths of from 4 to 8 fathoms, excepting in one small spot near the middle that nearly dries at low water springs, and on which the sea is always breaking. The shoal is about half a mile long and one quarter of a mile broad, with Seal island bearing N.W. $\frac{1}{2}$ W. distant $3\frac{1}{4}$ miles.

Abreast of Gordons bay, in the north-east corner of False bay, is another shoal patch, about a third of a mile in diameter, with from 6 to 9 fathoms, and on which the sea breaks in heavy gales. The shoalest part lies $3\frac{1}{4}$ miles off shore, and S.E. by E. $\frac{2}{3}$ E. nearly 6 miles from East shoal.

SIMONS BAY, situated about 11 miles northward of Cape point and near the north-west corner of False bay, is accessible all the year round, and affords complete shelter, for with heavy south-easters, the only winds that cause any inconvenience, vessels ride safely; and though the bay is exposed to east and north-east winds, these never blow strong. The shores of the bay may be approached to within 2 cables, and the closer a vessel lies to the patent slip and hospital, the more sheltered she will be in south-east winds; but in bringing up, care is required not to foul the several pairs of moorings laid down for men-of-war. If, therefore, it is purposed taking an inshore berth, it is better to bring up on the south-east side of the bay, well under Blockhouse point, on which stands a fort and round white tower one-third of a mile from the sea.

Wharf rock, having 9 feet of water, lies 2,500 yards East of the entrance to the Dockyard boat camber ; and is marked by a beacon with the word Rock on it.

The Dockyard, though small, is a complete establishment, and has all the necessaries required for refitting and provisioning Her Majesty's vessels. Ten sets of Government moorings are laid down in depths varying from 4 to 9 fathoms of water, with many lighter sets nearer the shore for dockyard craft.

There is a Government patent slip, which at spring tides is capable of taking up vessels of 1,000 tons, that can be lightened to a draught of 14 feet. *See* repairs.

There is also a naval hospital and a recreation room.

Simons bay is in telegraphic communication with Cape town. A railway connects Cape town with Kalk bay, distant 6 miles by the road, from Simons town. The mail steamers do not touch here. Population is about 2,500.

Position.—The dockyard flagstaff is in latitude $34^{\circ} 11' 32\frac{1}{2}''$ S., longitude $18^{\circ} 25' 51''$ E.

Time Signal.—A circular disc, attached to a lever arm working on a mast, is situated close to Simons town telegraph office. The disc is raised to a right angle with mast at 5 minutes before signal, and falls (by electricity from the Cape observatory) at moment of 1h. 0m. 0s. p.m. Cape mean time, corresponding to 23h. 46m. 5 $\frac{1}{3}$ s. Greenwich mean time. When signal fails in accuracy, the disc is kept up till 2 o'clock, then lowered.

LIGHT.—From a light-tower, 48 feet high, painted in red and white horizontal bands, erected on Roman rocks, is exhibited, at an elevation of 54 feet above high water, a revolving white light, which shows a bright face for *twelve seconds every half minute*, and visible in clear weather from a distance of 12 miles.

Supplies.—The water in Simons bay is excellent ; it is brought alongside in a tank. There is a smaller tank for merchant vessels, but the dockyard tank is frequently lent to water merchant ships on application.

Supplies of all kind, if in excess of what Simons town can supply, are obtained from the interior and from Cape town, distant by road and rail about 20 miles. Fish is abundant, and the beaches are good for hauling the seine.

Repairs.—Moderate repairs to engines, and to boilers of 500 horse power are undertaken in the dockyard. Ten-inch shafts can be

turned, cylinders of 40 inches diameter bored, and castings of 5 tons made. There are two steam-hammers of 15 and 10 cwt., and the crane on the boat camber pier is capable of lifting $2\frac{1}{2}$ tons.

Coal.—A large supply of coal is kept in stock ; it is delivered alongside in bags in small lighters at the rate of 250 tons per day. At times coaling is interrupted by gales. Labour is plentiful.

Caution.—There is a fish in Simons bay commonly called toad-fish, about 6 inches long ; back dark, with deep black stripes ; belly white, with faint yellow patches ; it swims near the surface, and is a constant attendant on lines employed fishing. When taken from the water it puffs out considerably. Should any portion of the fish be eaten, *death* ensues in a few minutes.

Anchorage.—A good berth for a large vessel in Simons bay is about half a mile off shore, in $9\frac{1}{2}$ to 10 fathoms, with Noah's Ark S.E. $\frac{1}{4}$ S., and the dockyard clock W. by S. $\frac{1}{2}$ S. Vessels moor in this road north-west and south-east, with the stoutest ground tackle to the north-west from May to September, for this being the winter season, the winds prevail from that quarter, and often blow in strong gusts over the hills. From September to May the S.E. and South winds may be expected to predominate ; then the best bower should lie to the south-eastward.

Compass Deviation.—Iron and other vessels desirous of testing their compasses, to ascertain the local attraction, will find it convenient to use Sharp peak, a conspicuous mountain to the north-east of Hangklip berg, which rises over cape Hangklip, instead of having a person stationed on shore taking simultaneous observations. The true bearing of this peak from the anchorage is S. 71° E. ; and as the peak is 24 miles distant, the bearing will not be materially affected by the change of position of the vessel in any part of the anchorage in Simons bay.

Tides.—It is high water, full and change, in Simons bay at 2h. 44m. ; springs rise $5\frac{1}{2}$ feet, neaps $3\frac{1}{4}$ feet. There is but little current perceptible in the bay at any time.

Directions for False and Simons bays will be found on page 66.

Winds.—From October to April, south-easterly winds generally prevail, but do not continue longer than five or eight days at a time, and are succeeded by variable winds. In Simons bay as in False bay, it frequently happens that these winds, after blowing very hard for a day and part of the night, abate towards morning, and are succeeded by a land breeze from the W.N.W. By taking advantage

of this, and weighing with the first of the breeze, a sailing vessel may sometimes get to sea before the return of the south-easterly wind. If unable to accomplish this, the most prudent plan will be to return to the anchorage in Simons bay.

In the south-east season, these winds blow frequently and with violence from S.S.E., making landing in boats disagreeable and at times almost impracticable. It is often found that when blowing hard from the south-eastward in False bay, there is a gentle breeze from the north-westward in Table bay.

From April to October, north-westerly winds are most prevalent with frequent gales and rain from that quarter. These gales occur at times all the year round, but they are rare in the south-east season. The wind scarcely ever blows from the north-east, and never with violence. The south-west wind (commonly called the kloof wind) is cold and frequently rainy. During this wind no boats should sail in the bay on account of the violent and variable squalls which come down from the hills.

If the barometer stands at 30·2 to 30·3 and falls suddenly to 30·0 or 29·95, in nine cases out of ten it will blow a strong S.S.E. gale. The Muizenberg capped with white cloud is generally the precursor of a south-east wind; and if the Hottentot Holland range on the east side of False bay is also capped, the south-easter will probably be violent and of long continuance. When Simons berg has a misty cloud on its summit, rain may be expected within an hour or two.*

NORTH AND EAST SHORES OF FALSE BAY.—Northward of Simons bay the land ranges in height from 800 to 1,200 feet as far as Muizenberg mountain, which is 1,651 feet high. There are four remarkable sand patches on this coast—the first on the north-west shore of Simons bay, the second between that and Elsey peak, the third in Elsey bay, and the fourth in Fish-hook bay.†

Kalk bay (pronounced *Cork*), is the present terminus of the railway from Cape Town. From a small fishery station a few years ago it has now become a fashionable watering place, and several hotels have been erected. The only good landing along the north shore is at Kalk bay, where a projecting ledge of rocks makes a little shelter.

* Captain Lord Charles Scott, H.M.S. *Bacchante*, 1881, remarks, that the Hottentot Holland range are the first to cover on the approach of a south-easter, and that if the Muizenberg does not cover it may not blow home to Simons bay. See also p. 9, winds off the Cape, &c.

† See Admiralty chart: Cape of Good Hope and False bays, No. 636.

Eastward of Kalk bay the shore is a low sandy beach with a continuous line of breakers fronting it, and no landing. This portion is not frequented.

The eastern shore of False bay to the southward of Gordons bay is bold, having no outlying dangers more than one quarter of a mile off. The high land comes close down to the south side of Gordons bay, whence to Hangklip is an unbroken chain of mountains.

The Strand is a fishing station about $2\frac{1}{2}$ miles north of Gordons bay. It has a boat harbour formed by a circle of sunken rocks extending some distance from shore. The entrance is narrow, but when inside it affords good shelter.

Gordons bay is formed on the north-east side of False bay, and affords shelter from south and easterly winds. As it is quite exposed to westerly winds vessels can only lie there in the summer months.

H.M.S. *Boscawen* anchored here in December 1857 in 10 fathoms, with the south point of the bay S.W. $\frac{1}{4}$ W. The wind shifted to the S.W. and a very heavy swell set in, but it was not dangerous, as the ship lay broadside on with a slack cable.

Kogel bay lies about $5\frac{1}{2}$ miles to the southward of Gordons bay ; it is about three miles across and falls back to the eastward more than a mile ; but the bottom in many parts being rocky it is not a good anchorage, although shelter may be obtained from south and easterly winds.

Pringle bay or cove, 3 miles north-north-east of cape Hangklip, is open to westerly winds. It affords good shelter in S.E. gales, in depths of 9 to 10 fathoms. H.M.S. *Sidon* rode out a strong S.E. gale here.*

Cape Hangklip.—The quoin-shaped hill of this name (sometimes called False cape), 1,448 feet high, is the eastern point of entrance to False bay, and makes as an island in approaching from the southward. Its western face appears to overhang from some points of view (hence its name), and a conspicuous sand patch extends half way up its south-east side. The cape itself, about $1\frac{1}{2}$ miles southward of this hill, is very low, and a heavy sea always breaks upon it ; a sunken rock lies N.W. $\frac{1}{4}$ N. three-quarters of a mile from the cape, at one-third of a mile off shore, and as the sea breaks some distance outside of this rock, it is not advisable to pass within one mile of the cape.

* Navigating Lieutenant F. Skead, R.N.

Inside Hangklip the land is low, then rises to a sharp peak 2,780 feet high, at the distance of $3\frac{1}{2}$ miles from Hangklip hill. This peak is the commencement of a chain of mountains extending to the eastward.

DIRECTIONS.—False and Simons bays.—Steam vessels or sailing vessels with a fair wind coming from the westward by day, and having opened the clearing marks for Anvil rock (*see page 56*), should, if bound to Simons bay, steer N.N.E. midway between Whittle rock and the shore ; and when Elsey peak is in line with Roman rocks lighthouse, bearing N. $\frac{1}{4}$ W., steer for it, altering course when within one mile of the lighthouse, so as to pass midway between it and Noahs Ark ; when the blockhouse on Blockhouse point bears W. by S., the vessel will be past Phoenix rocks, and may haul into Simons bay, taking, however, sufficient sweep to have time to choose a berth and room for rounding-to.

Working.—Vessels working in westward of Whittle rock and nearing that danger, will easily avoid it by keeping the beacons erected to show its position well open of each other ; or Chapman peak (a dark peak over the southern side of Hout bay) well open west of Elsey peak, N. by W. $\frac{1}{4}$ W. A line drawn from Oatland point beacon to Roman rocks lighthouse, N.N.E. $\frac{1}{4}$ E., passes one cable eastward of the 29 feet patch, and nearly 2 cables eastward of Maidstone rock ; vessels of heavy draught should not therefore pass within this line until the Admiral's house is open its breadth northward of Noahs Ark, bearing N.W. by W.

The ordinary channel for vessels entering Simons bay is between Noahs Ark and the Roman rocks, a width of 7 cables ; but if the wind be N.W., and the vessel under sail, the passage east and north of the Roman rocks should be taken, as it affords better working space. A vessel of large draught, however, when passing north-eastward of Roman rocks lighthouse should give it a berth of 3 cables to avoid Castor rock.

The four sand patches on the hills northward of Simons bay, are usually conspicuous and serve as good landmarks for the bay ; the western patch is a streak stretching down from the top of the hill.*

In thick weather, and uncertain of the position of the vessel, it is advisable to anchor when the soundings come under 20 fathoms.

If apprehensive of being near the Whittle rock in thick weather, it may be of service to know that on its south-east, south, and south-

* See sketch on Admiralty chart, No. 636.

west sides at half a mile distance, the depths are 22 and 23 fathoms, large bits of whitish shell without any sand ; the same bottom in 24 and 25 fathoms, will be found in some other places in the vicinity of this rock, but in no other part of the bay is the bottom of a similar nature.

At Night.—Care should be taken in rounding the Cape of Good Hope for Simons bay to give it a berth of not less than 3 miles ; by not going into less than 45 fathoms until the Cape light bears northward of N. by E. $\frac{1}{2}$ E., a vessel will clear Bellows rock.

When eastward of Anvil rock, with Cape point light bearing about N.W. by N., distant 3 miles,* steer N.N.E. until Roman rocks light bears N. $\frac{1}{4}$ W., then steer for it to within half a mile of the light when alter course to N.W., which should lead a quarter of a mile northward of Phoenix rock, and haul gradually into the anchorage.

Unless thoroughly acquainted with the navigation and favoured with moonlight, vessels, at night, should always pass eastward of Roman rocks. The four large sand patches on the hills northward of Simons bay are visible on bright nights, and in steering for Simons bay they will be ahead or on the starboard bow ; bearing this in mind will prevent the Muizenberg being mistaken for the hills southward of Simons bay ; these patches, with the exception of that over Buffels bay, are the only sand patches on the west side of False bay.

Passing Eastward of Whittle rock.—Running for Simons bay do not bring the Cape light to the southward of W.S.W. until the Roman rock light is between the bearings of N.N.W. $\frac{1}{2}$ W. and N.W. by W. $\frac{1}{2}$ W., between which bearings a vessel will be clear of the Whittle on the one hand and York shoal on the other. If working in, make short tacks between the above bearings of the Roman rock light, until certain of being within 5 miles of it.

By day, Chapman peak touching the western edge of the sand in Fish-hook bay, leads two-thirds of a mile eastward of Whittle rock. The whitewashed mark on the hill over Simons bay, kept well open eastward of the Whittle beacons, on Oatland point, also leads eastward of the rock.

Running for Simons bay in a South-easter.—It is not advisable for a vessel in a strong south-easter to run for Simons bay

* The Roman rocks light (also a revolving light) may be seen from near this position, if not from the deck, from the masthead.

at night, for the gusts of wind are violent, and there is a risk in bringing up; but should stand off and on the Cape under easy sail till daylight.

It has been recommended when entering Simons bay in a heavy south-easter, that vessels should pass outside the Roman rocks, so as to have more room for rounding to; but as by doing so the last mile must be passed with the wind abeam, there will be a risk of sails or spars unless close reefed. It is perhaps better to come in between the Roman rocks and Noahs Ark, shortening sail so as to have all furled when abreast of the latter, and to round to under the spanker only. The sheet cable should invariably be bent, and the anchor cleared away, when entering False bay in a south-easter.

The COAST between cape Hangklip and Danger point, about 27 miles to the south-eastward, forms a bight from 8 to 10 miles in depth. Mudge point lies about midway with Sandown bay to the westward, and Walker bay to the eastward of it. The remainder of the bight is composed of rocky projecting points, and landing can usually only be effected in certain places, and which are shown on the chart.* Palmiet river, 9 miles to the eastward of cape Hangklip, is a rapid stream in the winter season, but its entrance is always blocked up with sand. About three-quarters of a mile eastward of it is a small rocky cove, where a boat may land at high water, in fine weather.

Mudge point is low and rocky, and there are many sunken rocks off it, which, with the masses of kelp about them, form the south side of D'Urban cove, where there is good landing in east and south-east winds. The gig of H.M.S. *Birkenhead* landed after the wreck of that vessel, in a small rocky cove at the south extremity of the sand in Sandown bay, where there is a fishing-station, but the landing at D'Urban cove is the better and safer of the two. A coast range of hills terminates near Mudge point in Onrust berg, a square bluff, 1,575 feet high, which has a pile on it.

WALKER BAY is remarkable for the immense tracts of sands and high sand-hills at its head, which are visible a long distance at sea, and give a distinctive character to the land, which would have been aptly expressed by the name Sandown. About midway along the sand and one mile inland is a sand hill pyramid 427 feet above the sea. A long heavy swell always rolls into the bay, and the water is deep within one mile of the beach.

* See Admiralty charts:—Cape of Good Hope and adjacent coasts, No. 2,095; Table bay to cape Agulhas, No. 2,082; and cape Hangklip to Dyer island, No. 2,571; scale, $m = 1\text{'}0$ inch.

Klein river, in the northern bight of Walker bay, is a stream of considerable size inland, but its mouth is choked with sand.

Stanford cove, a small rocky inlet, similar to D'Urban cove before described, also affords landing in east and south-east winds. It lies in the rocky southern shore of Walker bay, 5 miles north-east of Danger point. There are several rocky patches off it, which, with the heavy swell, renders it less available than Hydra bay. There are some fishermen's huts, and plenty of good water near Stanford cove.

Hydra bay, lying between Stanford cove and Danger point, is the best anchorage under that point, as farther in Walker bay the swell is heavier. It is easily distinguished by a sand patch which marks the face of the hillock over it. In approaching Hydra bay from the southward, the pitch of Danger point should not be approached nearer than 2 or 3 miles; the bluff hill of Mudge point may be steered for until the sand patch is well open, when the rocky spit projecting from Danger point will be cleared. Then haul up for the bay, and anchor in 12 or 14 fathoms, about three-quarters of a mile from the shore, taking care to keep the low extreme of Danger point open of the intermediate points, to avoid the 3 fathoms rocky patch in the centre of the bay, upon which the sea does not always break.

Tides.—It is high water, full and change, in this neighbourhood, at 2h. 50m.; springs rise 5 feet. The rise of the tide and the establishment at Simons bay, Dyer island, and Struys bay are very nearly the same, and the stream of tide along the whole coast between cape Hangklip and Struys bay is inconsiderable and uncertain.

DANGER POINT, the south-west extreme of Walker bay, is a tongue of low hummocky sandy land covered with bushes and stunted trees, projecting about $4\frac{1}{2}$ miles from the base of Duin Fontein berg, which is 1,130 feet high, and a conspicuous, remarkable bluff hill from every point of view at sea. This point affords shelter, in Hydra bay, from the S.E. gales of summer.

The depths are irregular off Danger point. If approaching it at night, do not go into less than 35 or 40 fathoms.

Birkenhead rock.—Several detached sunken rocks are met with off this part of the coast, the most dangerous of which lies about one mile from the pitch of Danger point, with 2 fathoms water, and from 10 to 18 fathoms within a short distance. It has

acquired a melancholy celebrity as having caused the loss of H.M.S. *Birkenhead* and 436 lives, in February 1852, hence its name. There is a channel with irregular depths between Birkenhead rock and the reef stretching out from Danger point, but it is advisable to pass seaward of the rock. The sea breaks with violence on the rock, but often only at intervals of about a quarter of an hour.

DYER ISLAND, $6\frac{1}{2}$ miles south-eastward of Danger point, is a low rocky islet, visible only at a short distance. It is the abode of rabbits and numerous sea birds, and a little guano may be collected on the island. Geyser island is smaller, and formerly the resort, in certain seasons, of seals, for killing which there was a permanent establishment on Dyer island. These islands, together with the numerous rocks, extending nearly $1\frac{1}{2}$ miles to the westward of them, form a natural breakwater, under which vessels may find shelter in south and south-east gales.*

Landing is not good, and at times impracticable. The best is near a small staff and shed, the marks of a disused sealing station.

Anchorage.—Directions.—Dyer and Geyser islands, being low and white, are made out with difficulty when seen against the sand hills on the adjacent coast. In approaching them from the southward, keep Palmiet valley (in the high land near cape Hangklip) open of Danger point until Geyser island is in line with Gunners Quoin to avoid the reef, which does not break in fine weather, extending westward of Dyer and Geyser islands; then haul up for Duin Fontein berg, and when Gunners Quoin is open northward of Dyer island, steer for it, and anchor in 10 to 12 fathoms, with the extremes of Dyer island bearing about S.S.E. and S. by W., distant about one mile.

The bottom is sand, and the holding ground good, but the reef affords no shelter from south-west winds. There is a narrow channel, with depths of 3 fathoms between the east end of Dyer island and the rock above water inshore, which a small vessel might find practicable under favourable circumstances, but it cannot be recommended; the sea breaks across it in southerly winds. Foul ground, with heavy breakers, extend from the Sandy point abreast, to within one mile of Dyer island.

THE COAST from Danger point to Quoin point, a distance of nearly 19 miles south-eastward, is low near the sea, and backed by bare rugged hills of moderate elevation, one of which, called False

See also Admiralty chart: Dyer island to Struys bay, No. 2572; scale, m = 1 inch.

Quoin, from its shape, is 888 feet high, and about half-way between Danger and Quoin points. A long, heavy swell constantly breaks on the shore, which is inaccessible.

At about $5\frac{1}{2}$ miles eastward of Danger point at the head of a bay, is the mouth of the Uilkraal, a small stream, checked at its junction with the sea by sand.

Patches.—About half-way between Dyer island and Quoin point are two rocky patches, $1\frac{1}{2}$ miles off shore, upon which the least water found was 4 fathoms. The sea breaks upon them when there is any swell.

Gunners Quoin (Buffel Jagt berg), is a conspicuous bluff hill, 997 feet in height, named from its resemblance to a quoin, which, however, it does not bear when viewed from the westward. Quoin point is a square projection of hummocky land, from the base of the Gunners Quoin, and is 3 miles from it. It is fronted by sunken rocks and heavy breakers to the distance of $1\frac{1}{2}$ miles from the shore, and is distinguished, when seen from the southward, by two sandhills near its extremity.

The Coast from Quoin point to cape Agulhas, 18 miles to the south-eastward, is low and sandy, except abreast of the flat-topped range named Zoet Anys, where it is steep and rocky. The whole is exposed to the full force of the ocean swell, and landing is impracticable.

The depths are shallower along this part of the coast than they are off, and to the westward of the Quoin; and between about 2 and 4 miles eastward of the south-east face of Quoin point and $1\frac{1}{4}$ miles from the shore are several rocky patches, some of which are above water.

Directions.—In standing towards any part of this coast, cape Agulhas light should not be lost sight of, and a vessel should stand off before the light disappears on a S.E. by E. bearing. From the westward, having passed Quoin point at a distance of 5 or 10 miles, a S.E. $\frac{1}{2}$ E. course, made good, will round cape Agulhas at a similar distance. See page 77.

There is tolerable shelter and smooth water, in strong north-west winds, under the lee of the reefs 4 miles eastward of Quoin point, and it is possible that a small vessel might find the same shelter close under the east extreme of Quoin point.

CHAPTER III.

CAPE AGULHAS TO CAPE RECIFE, ALGOA BAY.

(Long. 20° E. to $25^{\circ} 40'$ E.)

VARIATION IN 1889.

| | | | | | | |
|--------------|---|---|---|---|---|---------------------|
| Cape Agulhas | - | - | - | - | - | $30^{\circ} 20'$ W. |
| Cape Recife | - | - | - | - | - | $29^{\circ} 50'$ W. |

AGULHAS BANK.—The limits of this extensive bank, southward of cape Agulhas, have been fairly defined. The 100 fathoms line appears to extend from near the shore in the vicinity of Bashee river to the south-westward, passing cape Recife at about 20 miles distant, and the meridian of Mossel bay at 60 miles ; here it trends southward, reaching its outer limit in lat. $36^{\circ} 45'$ S., long. $20^{\circ} 45'$ E., thence it inclines northward, passing the Cape peninsula at a minimum distance of 5 miles. Nowhere does the edge of the bank appear to be very steep ; the general soundings on it are from 45 to 80 fathoms.

Eastward of cape Agulhas the bottom is generally rocky, or coarse sand, shells, and small stones, whilst to the westward of Agulhas, mud or green sand will be found southward of lat. $35^{\circ} 15'$ S., but within 50 fathoms the bottom is rock, sand, or stones, and beyond 90 fathoms generally sandy, with black specks. The quality of the bottom is not, however, sufficiently ascertained to enable seamen to determine their position by it.

There is one marked effect of the Agulhas bank in quieting the heavy seas which roll up to it. A vessel may be exposed to a turbulent and irregular sea while in deep water and outside the bank, endangering spars and threatening to break over her, but the moment soundings of 60 to 70 fathoms are gained the sea becomes comparatively tranquil.

CAPE AGULHAS is a rocky projection, and the most southern part of Africa.* The features of the land about cape Agulhas distinguish it from the neighbouring headlands. Viewed from a distance seaward, east or west, the north and south elevations resemble two oblong hummocks. At a distance from the southward the two appear united. The highest part is 455 feet above the sea, and its distance from the extreme of the cape about one mile.

On the first undulation within cape Agulhas is the lighthouse, which is at times somewhat difficult to distinguish from the southward against the higher land behind.

Westward of the cape, the coast trends a north-west direction to Quoin point. Immediately to the eastward of the cape are two small indentations, the first of which is named St. Mungo bay. The whole of the coast about cape Agulhas and thence to Northumberland point consists of rugged sandstone and quartz rocks, or rocky reef, extending out one-third of a mile, and perfectly impracticable for boats to approach.

Exposed to the uninterrupted oscillations of the Southern ocean, the sea breaks heavily all along on this iron-bound shore, particularly during southerly winds. A vessel touching on it has not the slightest chance of escaping destruction. *See* directions, page 77.

LIGHT.—The lighthouse on cape Agulhas is a round tower 100 feet high, painted with horizontal red and white bands alternately. It exhibits a *fixed* white light at an elevation of 128 feet above the sea, visible from seaward between the bearings of West and S.E. by E., and in clear weather should be seen from a distance of 18 miles. It is frequently invisible at this distance.

Northumberland point lies 3 miles eastward of Agulhas lighthouse. It is low and sandy immediately on the beach, but a dangerous ledge of rocks surrounds the point, and shallow water extends in a south-east direction about one mile from the point. A detached rock, which breaks at times, lies S.E. by E. $\frac{1}{2}$ E. distant $1\frac{1}{2}$ miles from the point. Westward of the point the reef extends off about one-third of a mile, and the sea breaks heavily near it with S.E. winds.

A bank about one mile in extent, with from 7 to 9 fathoms water, lies with its north edge on the parallel and eastward of the lighthouse, and distant from it $5\frac{1}{2}$ miles. The sea breaks on it in bad weather.

* See Admiralty charts:—Cape of Good Hope and adjacent coasts, No. 2,095; No. 2,572, and cape Agulhas to Mossel-bay, No. 2,083; scale, m = 0.3 inches.

STRUYS BAY, lying between Struys and Northumberland points, affords shelter in West to N.W. winds, but is wholly unsafe in any wind from W.S.W. round southerly to East. From opposite the houses in the west part of the bay the beach is clean sand to within 2 miles of Struys point, where flat jagged rocks commence ; behind this sandy beach is a line of sand hills, the highest of which is 100 feet above the sea ; some are bare, and others are more or less covered with bush (a feature which distinguishes the coast from Struys point to the next point east of it) ; behind these again is a green covered ridge attaining a height of 200 feet which, at an average distance of 3 miles from the beach, drops suddenly away to a plain extending for 6 or 7 miles to the base of the Driefontein range of hills.

Anchorage.—The anchorage in Struys bay is under Northumberland point. Vessels from the westward, intending to anchor, may round Northumberland point in 10 fathoms water, at a distance of about 2 miles, and when the stone house bears W.N.W., haul into the bay, keeping the lighthouse to the northward of W. by N. $\frac{1}{2}$ N. until Northumberland point bears N.W. $\frac{1}{2}$ N. Then steer N.N.E., which should lead half a mile clear of the outer rock off Northumberland point ; when the stone house in the bay bears W.N.W., steer to the N.W., and anchor in 5 fathoms sand, with the house bearing W. $\frac{1}{2}$ S., and the sandy extreme of Northumberland point S.W. by S. Here the bottom is clear, while to the westward, and nearer to the reef, where the water is smoother, the bottom is foul, being composed of rocks interspersed with patches of sand. Large vessels are recommended to anchor farther out in 7 fathoms.

Vessels from the eastward, will clear the dangers off Struys point by keeping Agulhas light bearing well to the northward of West.

Caution.—With strong winds from S.W. through south to East, it is unsafe to venture into Struys bay, as the sea often breaks in 7 and 8 fathoms water. It has been the scene of several disastrous wrecks and it cannot be recommended, except as a temporary anchorage in west or north-west gales.

As a general rule, sailing vessels seeking shelter in this bay in a N.W. gale should put to sea immediately after it subsides, for the wind frequently changes in a few hours from blowing strong at N.W. to S.E. or south, in which case it is very difficult to work out, in consequence of the heavy sea which then rises.

Landing.—The landing place is a small cove to the north-west of Northumberland point, sheltered by a shelf of shingle projecting

from each extremity of the cove, but it is fast filling up with sand ; a wooden jetty at the end of which a vessel drawing 7 or 8 feet formerly secured has been dry for several years.

Water.—There are several wells, but the water is scarce and brackish ; it is procured only by digging in the sand beach above high water mark.

Bredasdorp.—The village of Bredasdorp is 16 miles or three hours journey distant from the landing place in Struys bay, where supplies can be obtained and where there is postal communication with Cape town.

Honing Nest or Matjies river.—This river runs into Struys bay near the centre between bare sand hills : it is the outlet of many streams flowing from the hills northward and westward for many miles which form often into lagoons in the flat described as lying behind this coast, flowing sluggishly and under various names with its tributaries as the Honing Nest, Kars, and Nieuw-jaar, until they unite and form this river : it is unimportant and usually fordable three-quarters of a mile from the mouth, and often at the mouth, but the latter is dangerous.*

Tide and Current.—It is high water in Struys bay, full and change, at 2h. 50m. ; springs rise 5 feet. During the examination of this part of the coast, in September 1848, no current was observed in the bay, or within 2½ miles of the shore, but the fishermen state that a strong current frequently sets to the westward round Northumberland point. A vessel becalmed in the offing, was seen from the anchorage drifting to the eastward more than one mile an hour. On two other occasions, close to the shore, about 2 miles to the westward of cape Agulhas lighthouse, the stream ran through the whole night steadily to the N.W. at 1½ knots per hour. These changes may probably be traced to the effects of the wind.†

Several accounts concur in stating that eastward of cape Agulhas the current has been found to set towards the shore ; this indraught seems to be stronger between the months of January–April. A large proportion of the wrecks which have occurred between capes Agulhas and Infanta have been attributed to it. See pages 22 and 23.

STRUYS POINT, is a mass of bare sand hills 200 feet high, sloping southward for nearly one mile to low-water mark, where it is rocky.

* The information from Struys bay to Breede river is by Nav. Lieuts. D. J. May, and W. E. Archdeacon, R.N., 1866-68.

† Skead.

Beacon.—A stone pyramidal beacon 34 feet high, surmounted by a ball 4 feet in diameter, is erected on Struys point. The beacon is coloured red to seaward, with red and white bands on the east and west sides, and stands about 2 feet above high water spring tides.

Blinder rock.—From Struys point a chain of detached patches of rock extend in a S.S.E direction. On the outer one, named the Blinder, there is a depth of 3 fathoms at low water, with 4 to 6 fathoms close-to, and 7 to 9 fathoms at a distance of 4 cables. The rock lies with Struys point beacon bearing N.N.W. distant $1\frac{1}{10}$ miles.

At about 3 cables inshore of the Blinder rock is the Bulldog or Saxon reef, with 2 fathoms at low water, 8 fathoms close-to, and about 4 fathoms between it and Blinder rock. Between the reefs lying between Bulldog reef and Struys point, there are boat passages, available in fine weather.

In standing towards these dangers, cape Agulhas light will be lost sight of when bearing West, that line of direction passing about 3 cables to southward of Blinder rock.

Marcus bay.—From Struys point the coast trends north-eastward for about 5 miles to Hoop point, forming Marcus bay, which is not unlike Struys bay in appearance, but here there are no buildings seen, and it has rocky points jutting into it at its western end; fishermen live near and beach their boats on one of the sandy beaches in ordinary weather. Just within Struys point, at the first rocky point, is a cave about 50 feet in diameter, into which the sea washes at high water.

The shore from 2 miles eastward of Struys point, is a sandy beach with a fringe of low flat jagged rocks rendering it unapproachable; it is backed by rocky hills covered with sand, 150 feet high; behind these hills is a range of green covered hills which drop to the plain behind at 2 to 3 miles distant from the coast. Marcus bay has rocky patches in it; but it affords shelter in westerly and north-westerly winds equal to that of Struys bay.

Martha point, about 5 miles eastward of Hoop point is so called from the name of a vessel wrecked here: it is the scene of more wrecks than any other part on the south coast of Africa, and the beach is strewed with their remains; the coast between Struys and Martha points is fringed with reefs, with depths of 4 to 6 fathoms, and on which the sea breaks in heavy weather.

Atlas reef, eastward of Hoop point, with 3 fathoms least water, named from the Dutch ship *Atlas*, which was wrecked on it, lies $1\frac{1}{10}$ miles from the shore, with Struys point bearing W. $\frac{1}{4}$ S., distant 7 miles, and a triple isolated peak inland N.W. $\frac{1}{4}$ W. The peak on

this bearing appears like a cone. Miles Barton rock, with 4 fathoms, lies 6 cables from the Atlas reef, in the direction of Struys point ; a patch of 5 fathoms lies 4 cables seaward of Miles Barton ; and two patches with the same depth lie one and two miles eastward of Atlas reef.

DIRECTIONS.—Rounding Cape Agulhas and Struys point.—Vessels from the westward (*see page 71*), after rounding cape Agulhas, should keep the light in sight ; it is advisable not to bring it to the westward of W. by N., on which bearing a vessel will pass the dangers extending from Struys point at a distance of 3 miles. From the eastward, Agulhas light must not be depended upon for passing Struys point, as in hazy weather, or from other circumstances combined with the distance of Struys point (14 miles), the light may be faint or altogether obscured, and the vessel may get within the line of danger. Under such circumstances, the point should not be approached at night to a less depth than 30 fathoms.

The like precautions are required in the day time, particularly in foggy weather ; for the high land of Agulhas may be invisible, while the sand-hills of Struys bay and the breakers off Northumberland point are distinctly seen. At such times it may be somewhat difficult to determine whether the vessel is eastward or westward of Struys point, because the shore features of Struys bay are very similar to the bay eastward of Struys point, but in the former there is a white house, beacon, and flagstaff near Northumberland point ; these, with the beacon on Struys point, should be sufficient to identify the coast.

Whilst to the eastward of cape Agulhas, sailing vessels should not approach the shore nearer than 7 or 8 miles, at which distance the cape should be rounded, for if it falls calm, the heavy swell which constantly rolls towards the shore will carry her with it, and the resource of anchoring would, probably, be of no avail, owing to the swell and the rocky nature of the bottom.

Vessels beating round cape Agulhas in strong north-westerly winds would find it safe and profitable to anchor in St. Sebastian, Marcus, or Struys bays, being prepared to weigh on a shift of wind.

Caution.—In rounding cape Agulhas either way, be careful not to mistake the lights of camp fires for Agulhas light.

COAST.—From Martha point the coast trends northward, and 3 miles beyond it is a large mass of bare sand hills, a broader sand beach, and fewer of the flat jagged rocks fringing it ; this continues for about 7 miles ; then the coast becomes again rocky, the bare sand

hills disappear, and the Driefontein range becomes inclined to the coast. At 13 or 14 miles from Martha point this range forms the coast line, intersected by deep watercourses, eastward of which the Potteberg range, 1,980 feet high, slopes gradually to cape Infanta.

Hoop lake.—At 1½ miles from the beach and 4½ miles eastward of Martha point is the south end of Hoop lake, which extends thence N. by W. nearly 4 miles, where the Zout river supplying it, flows from between the Driefontein range. Its west bank is low and flat, being the boundary of the plain extending far to the westward; its east bank is cliffy, and near it is a farm. This lake is shallow throughout, has no apparent outlet, and varies in depth, according to the season; the water is brackish.

ST. SEBASTIAN BAY.—Cape Infanta, the western extreme of St. Sebastian bay, is a bold cliffy rocky point situated 24 miles eastward of Martha point; a double point with remarkable masses of rock lies about one mile westward of it.

Rock.—A sunken rock, called the Blinder, a name commonly given to sunken rocks on this coast, lies about one mile southward of cape Infanta; its correct position has not been ascertained, and it only breaks after heavy gales.

Landing.—From cape Infanta the coast trends suddenly northward, and at the distance of one mile is Still bay, the mouth of a deep ravine, with a beach of large rounded stones; here fishermen can usually launch and beach their boats; this is the only landing place for many miles along the coast, and it can often be used when it is unsafe to cross the bar of Breede river.

St. Sebastian Bluff.—At the distance of 2 miles north-eastward of cape Infanta is St. Sebastian bluff, a bold perpendicular headland, 220 feet high; a ledge fronts the bluff to the distance of one cable, with a depth of 5 fathoms at the same distance beyond.

Beyond the bluff the cliffs cease and the land around the bight of this bay becomes lower, but deeply intersected for three-quarters of a mile from St. Sebastian bluff, when it slopes gradually to the shore and has a frontage of sparsely covered sand hills to the mouth of the Breede river, about 2 miles northward of St. Sebastian bluff.

The coast from the entrance of Breede river trends south-eastward, to cape Barracouta, the east extreme of St. Sebastian bay, a distance of 22 miles. It is composed of cliff-faced hills, ranging from 60 to 200 feet high; about 7½ miles eastward of the Breede is the little river Duivenhoks; a conspicuous sand patch on the west marks its entrance, and 4 miles inland is a hill named Wolfskloof, 744 feet

high. At 2 and 5 miles north-west of cape Barracouta there are conspicuous sand patches. Tromps Kop hill, 959 feet high, lies 6 miles northward of the cape. The coast from the cape eastward of Kaffir Kuyl bay is irregular, with several projecting points.

Anchorage.—There is good anchorage in St. Sebastian bay, and the western part affords shelter from all winds except those between East and South. The best position is with St. Sebastian bluff, bearing from S.S.W. to S. by W., and the high flagstaff on the south bank of the Breede river about N.N.W. $\frac{1}{2}$ W., in 8 fathoms, sand ; the water shoals gradually to 4 fathoms at a quarter of a mile from the shore.

Breede river falls into the sea in St. Sebastian bay, through a mouth narrowed by sand banks to 160 yards at low water. It is the most important navigable river in this colony, a steam vessel drawing 8 feet has often ascended it to Malagas, which is 20 miles by water from the mouth.

The southern side of the mouth of Breede river, is formed by low scant covered sand hills, on the top of two of them are flagstaffs, intended as leading marks over the bar, which has a depth of about 11 feet at high water springs ; the beach is fringed with rocks. The northern side of the mouth is formed by a long low sandy spit projecting southward from the foot of a conspicuous mass of bare sand hills, with shallow water extending nearly half a mile outside it. Within the mouth, for 3 or 4 miles, its navigable channel is intricate and varying ; above that it contracts and flows evenly between steep banks.

For 48 miles from the mouth the general direction of Breede river is north-westerly, but tortuous ; at that distance Buffeljagts river, a stream from the mountains 9 or 10 miles distant, flows into it ; beyond this confluence the Breede flows from the west, passing close to the town of Swellendam, near which the main postal road crosses the river, which point is 61 miles by the river from its mouth ; at 8 miles farther on it is joined by the river Zondereinde.*

Port Beaufort is a small trading settlement on the left bank of Breede river ; loaded vessels cross the bar drawing 11 feet and lie alongside a jetty. The value of the exports is inconsiderable.

Supplies are readily obtained except water, which has usually to be brought down the river in boats from a distance of 20 miles or less according to the season, though sometimes it is fresh at port Beaufort.

There is a postal communication with Cape town twice a week.

* See plan of entrance to Breede river, and port Beaufort, on Admiralty chart No. 2,083.

Tides.—It is high water, full and change, at the jetty at port Beaufort at 3h. 8m., springs rise 6 feet.

Directions.—Vessels wishing to enter the Breede river, should get under way from the anchorage in St. Sebastian bay at the last quarter of the flood, and having brought the flagstaffs on the south bank of the river in line, N.W. $\frac{1}{4}$ W., steer for them, which will lead over the bar in about 12 feet at high water springs; after deepening the water, open the inner flagstaff a little to the northward of the outer one, and keep close to the rocks on the south shore, this will lead to abreast the flagstaffs, close to which and on the beach will be seen a house. Still keeping on the same shore and a little farther in the narrowest part of the channel will be reached abreast the spit end, when it turns suddenly to the northward: the breadth is here 160 yards at low water, and a vessel may anchor in safety. As the channel thence to the jetty at port Beaufort is varying, no reliable directions can be given. A pilot is always ready and should be taken on board in St. Sebastian bay.

KAFFIR KUYL BAY, about 6 miles eastward of cape Barracouta, with Leven point midway between, is open to winds from E.S.E. to S. by W., and is therefore unsafe during the season of south-easterly winds; but in winter, when westerly winds prevail, cargoes may be safely landed or shipped.*

The anchorage is sheltered from the south-westerly swell by a reef which projects about half a mile to the southward from Morris point. It appears to be clear, with regularly decreasing depths of from 10 to 4 fathoms, with a bottom of sand and broken shells. The best anchorage is in $6\frac{1}{2}$ fathoms, about one-third of a mile from shore, with Morris point bearing about S.W. by W.

Kaffir Kuyl river is insignificant, and has a bar which is nearly dry at low water. There is a good landing-place in fine weather in the rocky cove on the south side of the mouth of the river.

COAST.—The shore eastward of Kaffir Kuyl river is a sandy beach for about 2 miles, whence it rises, and trends in a south-east direction for 12 miles to Izervark point; it is skirted with reefs, on which the sea breaks. Izervark point is bold and rocky, with Buffels Kop hill, 740 feet high, about one mile northward of it; Aasvogel berg, a long elevated mountain, 1,620 feet high, lies 11 miles northward from the point, and may serve to identify it.†

* See plan of Kaffir Kuyl bay on chart No. 2,083.

† The description of the coast from Izervark point to the Great Brak river in Mossel bay, is from the survey made by Francis Skead, Master, R.N., in 1862-63.

Between Izervark point and cape Vacca, 10 miles farther eastward, the coast consists of jagged rocks, on which a heavy sea is constantly beating. The land immediately at the back slopes to the height of 500 to 700 feet, and is covered with vegetation. Bull point, about 3 miles eastward of Izervark point, is not easily distinguished, being only a slight projection; at half a mile westward of it is a sand patch of a reddish colour; and South three-quarters of a mile from the patch and one-third of a mile off shore, are patches of detached reef which break and uncover at low water. At $1\frac{1}{2}$ miles from this rocky coast the depths range from 30 fathoms off Izervark point, to 20 fathoms south of cape Vacca.

Gouritz river enters the sea at about one mile westward of cape Vacca. There is a sandy beach on the western side of entrance, but the breakers are generally too high to make it available as a landing place. The sea breaks across the mouth of the river, which at the outer part is half a mile wide, but at half a mile within it is only 10 to 15 yards wide.

Cape Vacca, lying 15 miles west from the lighthouse on cape St. Blaize, is the extreme of a low flat of rock and shingle jutting out from a round hill which rises over the eastern side of entrance to the Gouritz river, $1\frac{1}{2}$ miles westward of the cape. In rough weather the sea breaks half a mile outside the cape, at which distance the depth is 9 fathoms. From the discolouration of the water, and the uneasy ground swell in the vicinity, it is more than probable that shoal rocky ground exists there.

Care must be taken in rounding this low cape at night, as it is only just within the range of the light on cape St. Blaize. The light is not seen within the bearing E. $\frac{3}{4}$ N., which is a little more than half a mile outside the cape. If the light is not seen, the lead will be the best guide either at night or in thick weather.

Flesh bay lies between cape Vacca and Flesh point, a distance of $2\frac{2}{3}$ miles. The shore of the bay is sandy, save at the extremes, which are rocky. About the middle of the bay there is a bare sand hill, 271 feet high.

Flesh bay affords no shelter, save as a temporary one in north-west gales, and it can only be used as a landing place in tolerably fine weather. Flesh point may be known by a flesh-coloured patch of sand. The point is bold-to on the eastern side, and may be approached to the distance of one cable.

Fish bay is formed between Flesh and Pinnacle points, separated by a distance of 9 miles; the latter is the well-defined commence-

ment of the rocky cliffs, about 250 feet high, extending 4 miles westward from cape St. Blaize. The whole of the shore of the bay is sandy, with small patches of rock showing about low water and through the breakers which are generally high. The land at the back, at the distance of one mile, rises 400 to 500 feet in height, and is covered with bush and vegetation.

Fish bay may be used by vessels seeking shelter from north-west gales. The best anchorage is in the west corner of the bay, in 7 to 8 fathoms, with Flesh point bearing about S. $\frac{1}{2}$ W., distant $1\frac{1}{2}$ miles, and the same distance off shore. It is advisable for vessels to put to sea as soon as the gale subsides, for then a heavy south-west swell sets in and causes a dangerous breaking sea. The best landing is near Flesh point, in a small sandy cove between rocks; but in fine weather boats may land in the bight under a farmhouse.

CAPE ST. BLAIZE is a bluff about 250 feet high, upon which, at 500 yards from the sea, is a square white light tower, with buildings at its base for the light keepers; just beneath the bluff is the Logan stone, a remarkable whitewashed rock. A windmill stands on the high land near the bluff, but it is only visible to vessels approaching from the southward or eastward.*

The extreme of the cape is a tongue of low land, fronted by reef to the distance of $1\frac{1}{2}$ cables. The Blinder or Windvogel, a rock with 15 feet water, and 5 to 7 fathoms around, lies a quarter of a mile off the cape; the sea breaks on the rock at low water and in rough weather.

Vessels proceeding westward from cape St. Blaize should be careful not to shut in the light, nor should they stand into less than 25 fathoms water.

LIGHT.—From the square white light tower, 45 feet high, on cape St. Blaize is exhibited at an elevation of 240 feet above the sea, a fixed *red* light, visible in clear weather from a distance of 15 miles. To the westward, the light is not visible when bearing eastward of E. $\frac{1}{4}$ N., or within half a mile of cape Vacca.

MOSSEL BAY, between cape St. Blaize and little Brak river, is about 6 miles wide; the whole of the western shore is a sandy beach. Between the Hartenbosch river and the little Brak are conspicuous sand hills, which are useful in identifying the bay when coming from the eastward. The mouth of the little Brak river is a dangerous

* See Admiralty charts: Nos. 2083 and 2084; also plan of Mossel bay, No. 639; scale, m=2·2 inches.

quicksand. At one-third of a mile from the head of the bay, is Seal island, about 15 feet high, with deep water around, and 3 to 5 fathoms between it and the shore.*

Mossel bay affords excellent shelter to vessels during the winter months, April to September, when heavy north-west gales are of frequent occurrence, and it is far preferable to use it as a place of shelter than to buffet the sea about cape Agulhas. During the strength of these gales the water in the bay is smooth, and vessels ride easily ; but it sometimes happens that a heavy south-west swell sets into the bay if the wind veers to West and W.S.W., rendering the bay unsafe, and landing difficult and at times almost impracticable.

In winter south-easterly winds are unfrequent, moderate, and of short duration. The heaviest gales during the year are from W.N.W. Winter gales commence from N.N.W. with heavy gusts, unsteady both in direction and force, then veering to W.N.W. or West. They blow very hard in continuous gales, with a low barometer (29·6 inches), finally shifting rather suddenly to S.W., when they subside with steady breezes and occasional showers.

During the summer season, September to April, when south-east gales occur, the bay is exposed to the full effect of the open sea, but these gales seldom last longer than 36 hours, and do not blow home. A heavy breaking sea then rolls in, and vessels trading to the port usually ride with a long scope of cable, with a coir or hempen spring to ease the strain ; with this precaution vessels ride safely, and the holding ground is good. As in Algoa bay, there appears to be a strong easterly current or undertow, which assists to ease the strain on the cables. Should a sailing vessel, however, not wish to risk riding out a south-easter, by putting to sea early she will be well able to clear cape St. Blaize by first making a long board to the eastward, in which she will be assisted by the undertow. It has been found that a rise of the barometer usually precedes a south-easter, and that the increase of the wind is gradual at the commencement. Moderate south-west winds even at this season of the year are very common.

Landing.—The south shore of the bay, for 3 miles north-westward of cape St. Blaize, is rocky, with the exception of three sandy coves, the outer two of which are named Vaarkens and Mauro. In Vaarkens cove is a substantially built jetty, protected by a small shelter pier from the east side of the cove ; here landing may generally be effected. The depth alongside the jetty is 11 feet.

* See Admiralty plan of Mossel bay, No. 639 ; scale, $m=2\cdot2$ inches.

Town of Aliwal.—On the rising ground over Vaarkens cove is the town of Aliwal, which consists of numerous houses, the greater number substantially built, an episcopal chapel and a Dutch church; various other buildings are in course of erection. The resources of trade and produce in the interior have been opened to this port by the formation of roads *vid* Ruyterbosch and Meirings Poort, through a gorge of the Zwaartberg range of mountains, and a thriving commerce is the result. There is also a bridge over the Little Brak river. The population of the town is about 1,360. The civil establishment is composed of a resident magistrate, a collector of customs, a district surgeon, and a small police force.

There is also a harbour master and an accredited agent for Lloyd's. No port charges exist.

Trade.—In 1886, 189 vessels amounting to 360,000 tons entered the port. In the same year the value of the imports was 155,000*l.*, and that of the exports 102,000*l.*

The principal exports are wool, skins, aloes, ostrich feathers, tobacco, cereals, and brandy; and the imports, general merchandise.

LIGHTS.—A fixed *red* light is exhibited from the extremity of the jetty in Vaarkens cove, and a fixed *green* light from a mast or beacon on the land, S.W. by S. of it, as leading lights to the anchorage.

In bad weather, a *red* light is exhibited on the rising ground at Erme bay, for the purpose of guiding vessels, which may part from their anchors and are not able to beat off, to the best spot for beaching.

Supplies.—Fresh water is supplied, at the rate of about 30 tons a day, from a pipe at the jetty end in Vaarkens bay. Fresh provisions and vegetables are to be had in any quantity, but coal only in small quantities.

Communication.—Aliwal is in telegraphic and postal communication with the Cape Colony, and the Union, Donald Currie and other lines of steamers call here. The railway is two days' journey distant. *See also p. 8.*

Directions.—Anchorage.—Approaching Mossel bay from the westward, the lighthouse bluff of cape St. Blaize will be conspicuous, the land at the back being quoin-shaped and somewhat resembling the Bill of Portland. In rounding the cape, keep Pinnacle point open southward of the rock under the cliffs just westward of the lighthouse bluff, until the large patch of sand at Hartenbosch river bears N. $\frac{1}{2}$ E., when the anchorage may be steered for, taking sufficient room for rounding-to, if necessary.

Coming from the eastward, cape St. Blaize may be identified by the lighthouse, which being white shows conspicuously against the dark background, by the windmill on the bluff, and by the remarkable sand patch at the mouth of the Hartenbosch river.

The anchorage in Mossel bay is abreast the town of Aliwal, between a line drawn from cape St. Blaize lighthouse through a conspicuous building with a double gable point, and the only house near the cape, bearing S.S.W. $\frac{1}{2}$ W.; and a line drawn from the windmill through Barry's store (a large two-storied stone building standing on the mound close to the sea at the west side of Vaarkens cove) bearing S. by W. $\frac{1}{2}$ W. Small vessels may anchor in this space in $3\frac{1}{2}$ to 4 fathoms.

Vessels seeking shelter only, should not go inside a depth of $6\frac{1}{2}$ or 7 fathoms, in either season of the year; the windmill in line with the jetty bearing S.W., is a good line to approach and to anchor on. Vessels intended to load or discharge may take a berth more to the westward, not going, however, within the western limit already mentioned.

At night, lights are shown from the jetty and from the mast beacon southward of it. These in line bearing S.W. by S., and with St. Blaize light S. $\frac{1}{2}$ W., point out a good position for anchoring, in about 5 fathoms water; depths of 6 to 8 fathoms will be found farther off on the line of the leading lights.

Should a vessel part her cable, with no hope of getting to sea, she should run for the *red* light in Erme bay, bearing W. by S.

Weather Signals.*—The following signals are made from the shore when bad weather is expected, and must be answered and obeyed without delay:—

Union Jack over flag S. - Prepare for bad weather.

Union Jack over flag J. - Drop second anchor, have buoy ropes and springs on cables, and be prepared to slip and put to sea.

Red flag above flag S. - Slip and put to sea at once; see that buoys and buoy-ropes are good.

Union Jack over flag H. - Shorten in cable to length veered on first anchoring.

Tides.—There is no regular stream of tide in Mossel bay. It is high water, full and change, at 3h. 30m., and the rise 6 to 7 feet.

COAST.—Great Brak river lies in the north-east portion of Mossel bay, about $8\frac{1}{2}$ miles from cape St. Blaize. It runs into the

* See the Lights, for bad weather light, page 84.

sea between sandy hillocks, 80 to 150 feet high, and which are mostly covered with scant bush. The beach is sandy, and fringed with rocks at low water. About 3 miles to the eastward, the sand hillocks disappear, and the coast becomes shelving and cliffy to the mouth of Mal Gat river.*

Mal Gat river is a stream running into the sea between high cliffs; its mouth is frequently closed with sand. The water is good, but of a dark-red colour. A little westward of the mouth, and one mile from the shore, there is a 10-fathoms patch, the depths around and inside of it being 18 to 20 fathoms. At $1\frac{1}{4}$ miles eastward of the mouth is a conspicuous cluster of rocks, all within $1\frac{1}{2}$ cables of the shore; there is a small sandy beach close eastward of these rocks. The land at the back slopes gradually from a height of 720 feet to the sea, where it presents a rocky unapproachable shore.

Gayang river lies 4 miles eastward of the Mal Gat; its mouth is often closed. The water is good, and of the same dark colour as the Mal Gat. Great Brak, Mal Gat, and Gayang rivers take their rise in the Outeniqua range of mountains, 4,000 to 5,000 feet high, upwards of 10 miles from the coast; they have formed deep channels for themselves across the elevated plateau, extending to the sea coast.

Dutton cove, lying close westward of Gayang river, is a slight indentation in the coast, in which lies a rocky islet; it affords no shelter.

From Gayang river the coast takes an easterly trend for 4 miles to Schaapkop river, next to which is Mill river and Christina bay. The coast thus far continues rocky and unapproachable, the background being high grazing land with patches of bush.

Christina bay is another spot in which an attempt has been made to make it available as a landing-place, from its nearness to George town; but it is quite impracticable. A fishing establishment was tried here, but without success; it is simply the embouchure of Mill river, which flows between steep, close, wood-covered hills. The beach is covered with large smooth stones.

Victoria bay lies half a mile beyond Christina bay. It is a broader indentation than the other, but is shallow, with a sandy beach, where landing may at times be effected; but no craft should attempt to enter it.

* See Admiralty Chart.—Cape Agulhas to Mossel bay, No. 2083; scale $m = 0\cdot3$ of an inch; also Mossel bay to cape St. Francis, No. 2084, scale $m = 0\cdot3$ of an inch. The information relating to the coast from Mossel bay to Groote river is by Nav.-Lieut. F. W. Skead, R.N., 1865-75.

George Town is situated on a plain behind the coast hills, at about 5 miles from the Gayang river, and the same distance from Victoria bay. It apparently is not visible from seawards and is of no importance to navigation.

Cayman river enters the sea at one mile north-eastward of Victoria bay. This river, like the others, is of no navigable importance; within a mile from the mouth the waters of Zwartie river join it; here the river is fordable. From the height of the adjacent woodlands, and the depth and windings of the stream in its rocky course, this spot forms a picturesque and romantic piece of scenery.

Touw river.—A little beyond Cayman river the cliffy coast ceases, the high land recedes, leaving an interval occupied by a chain of lakes (into which the various streams of the locality flow), fronted by the sandy hillocks of about 200 feet in height, which here recommence. The beach is sandy, but rugged low rocks cover and uncover at frequent intervals along it.

The mouth of Touw river lies a little more than one mile to the eastward of Cayman river, and is often closed by sand. It takes its rise in the Outeniqua mountains.

COAST.—From the mouth of Touw river the coast trends south-eastward about 21 miles to Walker point, the west horn of Buffalo bay, and which is 4 miles westward of Knysna harbour. For nearly 2 miles from the Touw the beach is sandy, with scattered flat rocks appearing at low water, backed by a ridge of irregular sand-hills, about 250 feet high. At that distance is a point of jagged rocks and the hillocks change from sand to stone, but the sandy beach continues to the south-eastward, with fewer rocks above low water, for $4\frac{1}{2}$ miles, when it becomes permanently rocky, and the stony hills increase in height to 300 feet. Thence the rocky beach extends to Gericke point, about 2 miles farther on, the sandy and stony hills are followed by continuous cliffs of a reddish colour, averaging 500 feet in height, the land at one mile behind rising to a height of 646 feet; it is not wooded.

Gericke bay, $9\frac{1}{2}$ miles from the mouth of the Touw, is unimportant in size, and with an apparently foul bottom; a rocky islet lies off Gericke point, and small rocks outside the islet, but all that uncover lie within half a mile. The rocky coast continues round this point for three-quarters of a mile, when the sandy beach again appears for a short space, across which Zwartie Vlei empties itself into the sea at certain seasons.

Lakes.—From the mouth of Touw river to the old mouth of Zwarde Vlei is upwards of 11 miles. Behind this extent of coast at varying distances to 3 miles, are the three lakes, Lange Vlei, Rond Vlei, and Zwarde Vlei. The first is composed of two parts, with channels connecting them, and extending 6 miles in all. The water is brackish, and has a maximum depth of 22 feet. The Wolfe and the Touw rivers are the principal, but not the only feeders of this lake.

Ronde Vlei, so named from its shape, is almost circular, with an average diameter of half a mile ; it communicates with, and is in reality a continuation of, Lange Vlei ; its maximum depth is 22 feet, water brackish and unfit for use, but near the edge of the lake tolerably good water is found by digging a hole. Wild fowl abounds on them all.

Zwarde Vlei is the largest in this chain of lakes, and most irregular in shape ; it extends upwards of 3 miles in one direction, and is connected with Ruigte Vlei, another and smaller lake. They are fed by the Diep, Wolfe, Zwarde, and Caratera streams. The water is brackish, and 48 feet deep in some places. Its south-east extreme is only about 2 cables distant from the sea, with which it appears to have been at one time connected by a passage known as Zwarde river, now closed up. The land at the back of the lakes rises to 700 and 800 feet, and is fertile. Though not wooded, there are many conspicuous small clumps scattered about, and it is deeply intersected by the streams, rendering the roads steep and bad. On the patch of land between the lakes and the sea the various wild ducks of the Colony are found. Oysters and fish may be obtained at the rocks on the beach.

Groens Vlei, irregularly oval-shaped, upwards of 2 miles long, and half a mile at its greatest breadth, contains fresh water. There are no streams flowing into it, and it has no visible outlet ; its greatest depth is 20 feet.

COAST.—From the mouth of Zwarde Vlei, conspicuous bare white sand extends south-eastwards for one mile, when the beach becomes rocky, and continues so for 5 miles, interspersed with patches of sand. The beach is backed by irregular hillocks from 200 to 300 feet high.

The land behind Groene Vlei rises abruptly, so that at 3 miles from the sea it is 1,110 feet high. It presents a smooth green appearance, with scattered clumps of trees. The valleys are more or less cultivated.

In bad weather, this coast is fronted with heavy detached breakers to the distance of one mile or more.

Goukamma river enters the sea at the east extreme of a sandy beach 2 miles in extent, and at about the same distance north-west of Walker point. The river is remarkable for its sudden rising after rains, and the depth of water then attained. At a distance of 4 miles by its course from the sea it is crossed by a causeway on the high road between George town and the Knysna ; this causeway is sometimes dry, and at others covered to the depth of 12 to 20 feet, with a rushing torrent. The river has an average breadth of 100 yards along these 4 miles of its course ; its mouth is closed by sand for long intervals during the dry season.

Walker point.—To the eastward of the Goukamma are two dangerous rocky points, including a small rocky and sandy bay one mile across. Off the western point at a quarter and three-quarters of a mile distant, are rocky patches on which the sea constantly breaks ; but the whole neighbourhood is foul. Walker point, the easternmost of the two, is also rocky and dangerous, and forms the western horn of Buffalo bay. A chain of rocks extend about one-third of a mile from the point, with a sunken rock at about 4 cables distant, but the sea breaks much further out.

The land adjacent, is sparsely covered hillocks backed by undulating ridges, but at a distance of 2 miles inland, the higher green-coloured land is reached, without trees, and rising to upwards of 900 feet.

BUFFALO BAY is included between Walker point and the rocky cliffs westward of the head, at the entrance to Knysna river, the distance is about 3 miles across. It affords shelter to small vessels during N.W. winds, but it should be remembered that the bay has not been sounded, and that rocks extend about half a mile southward from Walker point.

Anchorage.—Coasters, however, find shelter about midway between Walker point and the bight of the bay, half a mile off shore, in from 5 to 8 fathoms, clear bottom with blue clay ; nearer to the point the ground is rocky. With the wind anything to the southward of West it is not advisable to remain here, as a heavy breaking sea then sets in.

KNYSNA RIVER and HARBOUR (pronounced Nysna), is situated close to the eastward of Buffalo bay ; the entrance, about 250 yards in width, being formed by two steep and rocky headlands, on the eastern of which there is a flagstaff and a pilot signal station.*

Northward of the Knysna there is a mountain named the

* See Admiralty plan :—Knysna harbour with view, No. 1,224 ; scale, m= 4 inches.

Spitzkop, 3,048 feet high, eastward of which are five Paps, and at 10 miles eastward of the entrance is the Krantz Hoek, 914 feet high, fronted by a bluff 554 feet high, from which the coast slopes away to cape Seal, the Western point of Plettenberg bay; these serve to identify the Knysna from a distance.

Town.—The township of Knysna is situated about 3 miles within the entrance of the river, and on the eastern bank. It is built on the slope of the hill and on its outskirts are several villa residences. It boasts of several saw-mills, and there are several English residents, most of whom are connected with the timber trade.

Between the town and the river is a strip of land belonging to the Admiralty, which was originally presented to them by the principal land owner of the district; the remains of an old ship are still to be seen, where one small vessel was built.

Piers.—There is a pier or jetty near the south-west angle of the town, with a depth of 10 feet alongside, and a new jetty, with tramway, from Paarden island, with a depth of 23 feet alongside at low water, the island is connected to the town by a bridge.

Supplies.—The country around the Knysna abounds in various kinds of game, and the only wild elephants remaining in the Colony are found in the surrounding forests; permission to shoot them must be obtained from the Governor of the Colony. The river produces quantities of fish, and other provisions are abundant; water is to be obtained by application to the Port Captain. Good timber from the neighbouring forests is abundant, but coal is not obtainable. There are several firms of carpenters and engineers capable of effecting repairs to coasting craft, and vessels can be hove down. The climate is extremely healthy, and especially adapted to Europeans.

Communication.—There is weekly communication with Cape Town by steamer, and good roads to the interior. *See page 8.*

Trade.—During 1886, 89 vessels, chiefly steamers, entered the port; aggregate tonnage, 40,000. The chief export is wool and government railway sleepers, total value, £22,000. Imports, £32,000. Population of Knysna and suburbs, 1,000.

The harbour is by no means easy of access, even to small steam vessels, in consequence of the heavy surf which breaks across the entrance; for sailing vessels it is only practicable with a leading wind. There is a depth of 18 feet in the fairway over the bar at low water springs, and the services of a pilot are not necessary unless proceeding beyond Best cove. Vessels of 14 feet draught can proceed to Knysna, about $1\frac{1}{2}$ miles beyond the cove. Boats can ascend the river to Westerford farm about 9 miles up.

Bar.—Knysna river has two bars, the outer one with 18 feet least water, stretches across the channel from Needles point, on the west side of entrance. The inner bar extends across the mouth just within Emu rock, on the east side of entrance, and has from 16 to 18 feet at low water springs, the greater depth being nearer to the Emu, shoaling gradually towards both shores. Both bars are stationary, and are of rock, covered with sand and mud, which is stirred to the surface in rough weather. No difference in the depth of the water on the bars has been observed for many years.*

Beacons.—There are two beacons to guide vessels over the bar—one on Fountain point, just within the entrance on the east side, consisting of a white stone beacon built upon a large rock, and standing 30 feet above high-water mark; the other on Steenbok island, is a wooden one composed of a long spar with two triangles and painted red; these lie N.E. $\frac{1}{4}$ N. and S.W. $\frac{1}{4}$ S., 758 yards apart.

Emu rock, with 4 feet water, is on the eastern side of the channel, nearly one cable S.W. of Inner Obelisk point, above which is the signal station. The sea does not always break on the rock.

Black rocks, situated one cable southward from the south-western point of entrance, may be passed at one cable distance; the sea always breaks on them. South-East rocks are another cluster, distant $4\frac{1}{2}$ cables S.S.E. of the Mewstone.

Tides.—The tides run from 4 to 5 knots through the Narrows during springs. The flood sets strongly from the eastward towards Needles point, and from thence directly through the Narrows. The ebb from abreast Green point sets directly towards Fountain point, and on to the rocks between that point and Inner Obelisk point, and thence it follows the channel to the eastward, except there be a strong westerly current outside, in which case it runs directly to seaward.

With a heavy sea on the bar, at near high and low water, the force of the break drives towards Emu rock large masses of water, which set strongly out again close to the western shore, outside the inner bar. It is therefore advisable, before taking the bar with a breaking sea, that the flood should have made at least two hours, at which time the stream inwards and the break act together, and the drawback is not felt.†

* Information from H.M.S. *Wrangler*, 1882.

† H.M.S. *Peterel*, in September, 1867, drawing about 14 feet, in leaving the harbour arrived at the outer bar as three heavy rollers came in, one of which caused her heel to touch the ground.

It is high water, at full and change, at 3h. 30m. ; and the spring rise is from 6 to 7 feet.

Pilots.—On the hill over Inner Obelisk point there is a flagstaff, with which communication can be held by signals, and directions given for entering the harbour. There is also a pilot boat for giving assistance to and directing vessels entering or leaving the port. It frequently happens that, although the weather and bar may be favourable for vessels to enter, it may not be safe or possible for the pilot boat to go out.

The pilot signals used are as follows :—

White and blue diagonal.—The pilot boat is coming out.

Red.—Vessel is recommended not to attempt to come in.

White and red horizontal.—Vessel may come in now. If waiting for the tide, a red pendant will be shown over the flag at a proper time for entering.

Yellow.—Pilot boat cannot go out, but is ready to receive the vessel within the bar.

DIRECTIONS.—ANCHORAGES.—In case a vessel has to wait for wind or tide to enter Knysna river, she may, in moderate weather, anchor with the flagstaff bearing N.N.E., in 12 to 15 fathoms blue clay, one mile off shore ; she will then be in a favourable position to enter with any wind that will suit for crossing the bar. It is not advisable to anchor when the weather is unsettled, as the sea frequently sets in heavily from south-west with little or no wind. Attention must be paid to any signals made from the pilot station.

The best time to enter Knysna harbour is a little before high water. It is not advisable to go either in or out during the strength of the ebb at spring tides, more especially if there is any break on the bar. Steam vessels should approach the entrance with the beacons in line, bearing N.E. $\frac{1}{4}$ N., and keeping them so until nearly abreast Inner Obelisk point, thence steer to pass about 50 yards outside Fountain point, from abreast which, steer for Green point (the south point of Best cove) keeping close to it to avoid the tongue of sand which projects from the northern end of Steenbock island.* The distance of the point of the Spit (11 feet water) from Green point is 100 yards only. Having passed Green point, anchor in Best cove, known locally as Feather Bed bay in 4 fathoms. There is a depth of about 14 feet water close to the

* A buoy formerly marked the point of this spit, in 11 feet.

shore. There is no danger in grounding in any part of the river, as the bottom is soft.

Vessels proceeding to the anchorage off Knysna should employ a pilot. From Best cove, the Western shore should be kept aboard until abreast the stakes marking the edge of the spit extending southward from Paarden islands ; thence steer close along to the westward of the stakes and of the new jetty. When past the jetty the anchor should be let go, in about 15 or 16 feet, and when swung to the flood secure the stern to one of the mooring buoys, two of which are placed here for the purpose ; vessels can also lie afloat alongside Paarden jetty.

Before crossing the bar, under sail, it is necessary to have a boat in readiness with a kedge and hawser, as the wind sometimes dies away between the heads. In proceeding in, the wind should be at least two points southward of West, and not eastward of S.E. With the wind from the S.W. steer for Black rocks, keeping them a point on the port bow, until the beacons are in line, when proceed as before directed.

In entering the harbour with a S.E. wind, keep Steenbock island beacon a little open to the eastward of Fountain point beacon, to counteract the effect of the flood tide, which always sets strongly over towards Needles point, and when past that point, steer as before directed.

In leaving the harbour, under sail, the wind should not be to the westward of North nor to the eastward of E.N.E. The best time to get under way is with the last quarter of the flood, reversing the directions for entering. With a commanding breeze a vessel may go out with the last quarter ebb, but in getting under way care should be taken not to get too close to the eastern shore, as the ebb sets towards the rocks between Fountain and Inner Obelisk points.

It frequently happens that there is no wind in Best cove when there is a fine breeze blowing out through the entrance. During the summer months, when the winds prevail from S.E., almost the only opportunity of going out is early in the morning, when there is generally a breeze from the land, which dies away about 9 or 10 a.m. and is succeeded by the sea breeze.

The COAST from the entrance of the Knysna trends eastward for $3\frac{1}{4}$ miles to the mouth of Nütze river. It is composed of irregular red cliffs, 200 to 300 feet high, with patches of shingly beach, some above water, and points fringed with off-lying rocks, to the distance of half-a-mile in places. The back land rises steeply

from the cliffs to a height of 700 feet, clusters of trees become more frequent and larger towards the Nútze. It is throughout intersected with deeply worn watercourses.*

Between the Nútze and cape Seal are many peaked masses of rock, sometimes bare, at others clothed with vegetation, which occasionally rise as high as the cliffs, giving a characteristic appearance to this part of the coast.

The coast maintains the same precipitous cliffy character for 3 miles eastward of the Nútze, and rising steeply behind to a height of 900 feet. This portion, and for 3 miles inland, is inaccessible, being completely covered to the cliff heads with dense forest, which extends northward to Plettenberg bay road. At 4 miles eastward of the Nútze a deep gorge is reached, beyond which the country facing the sea assumes the usual smooth green appearance, with scattered clusters of trees.

No Landing.—There appears to be no spot on this coast where landing could be effected.

The Nútze is a stream flowing across a small patch of sandy beach into the sea, from between high wooded hills; its mouth is often altogether closed. At a distance of 3 miles from its mouth it is called the Witte Els.

CAPE SEAL is the easternmost point of a conspicuous tongue of land with rugged sides and overhanging cliffs, clothed with scrubby bush; it is rather more than $1\frac{1}{2}$ miles in length, rising about its centre to the height of 485 feet, and being joined to the mainland by a narrow neck, has from many points of view the appearance of a large high island.

Off its south side is a rocky mass, 123 feet high, about half a mile in length, joined to it by a narrow sandy isthmus; the sand continues up the sides of the hill over the top, a little westward of the highest part, and from seaward appears as a white stripe, and serves with the low gap on its left, as landmarks for the coast.

Whale rock, having a depth of 4 feet, lies S.E. from the pitch of the cape, and $3\frac{3}{4}$ cables from low-water mark. A patch of $3\frac{1}{2}$ fathoms lies nearly one cable north-west of the rock, but on the seaward sides it is steep-to. The sea does not always break on Whale rock.

PLETTENBERG BAY, may be considered to lie between cape Seal and Salt river, distant from each other about 9 miles. Plettenberg

* See Admiralty chart :—Mossel bay to cape St. Francis, No. 2084.

bay, from its suitable depths at easy distances from the shore, its good anchoring ground, and the shelter afforded, renders it equal, if not superior, to any other bay on the south coast. Vessels seek shelter here when the sea is too high to get into Knysna and Mossel bay.*

But like the other bays on this coast, it is exposed to the full force of the south-east gales that blow so violently from September to March ; but from the greater depth of water in this bay the sea does not break with such violence as in the others, and if the usual precautions be taken of consulting the barometer and other indications of the weather for a coming south-east gale, a vessel may easily get to sea by making a long board to the eastward, and so weather cape Seal on the opposite tack before it sets in with violence.

Settlement.—Landing.—Pisang river, situated at the head of the bay, is small, and frequently has its mouth closed, but affords a supply of fresh water ; at its mouth is a rocky islet, 40 feet high, sparsely covered with bush, on the top of which a post is erected.

Position.—This post is in latitude $34^{\circ} 3\frac{1}{2}'$ S., longitude $23^{\circ} 22\frac{3}{4}'$ E., and being close to the landing place masters of vessels can readily test their chronometers.

A rocky ledge, covered at high spring tides, lies about a quarter of a mile eastward of the islet, affording some shelter to the beach close northward of it, the only landing place, though it is not always practicable. There is a depth of about 8 fathoms at one cable outside the ledge, and a narrow chennel, with 3 fathoms water between it and the islet. The old residency, the Government store houses, a little church and parsonage, with stores and such moderate supplies as the place yields, are close at hand.

Numerous farms are scattered over the country and in the valley of Pisang river, whence supplies of meat and vegetables can always be obtained. Water has generally to be rafted through the surf in casks. There is little or no trade, and there are but few people in the immediate neighbourhood of the port. The nearest town is Knysna, which is some 20 miles distant ; communication with the interior is by ox waggons. There is no telegraph.

Directions.—There are no dangers in entering or leaving the bay, except Whale rock, which should be given a berth of about one mile. The channel between it and cape Seal should not be attempted, as there is generally much swell, and when it blows strong the wind is unsettled and baffling near the cape. The south end of the long

* See Admiralty plan :—Plettenberg bay, No. 385 ; scale m = 2·4 inches.

sandy beach in Plettenberg bay, in sight, leads north-eastward of the rock.

Anchorage.—Vessels visiting Plettenberg bay to ship timber usually anchor under shelter of the ledge of rocks off Pisang river. Vessels seeking shelter from westerly gales should anchor more in the southern portion of the bay, with the Gap in the peninsula bearing S.W., and the extreme of the cape from South to S. by E. $\frac{1}{2}$ E., in depths of 15 to 8 fathoms, sand. There is generally a heavy surf on the beach which prevents landing.

A vessel, in case of necessity, seeking anchorage in a south-east gale, may go nearer to the Gap and find good anchorage in about 7 fathoms; but it is not recommended ever to ride out a south-east gale when it is practicable to get to sea.

Tides.—It is high water at Plettenberg bay, full and change, at 3h. 10m., and the rise is 6 feet. There is no regular stream of tide in the bay.

Kourboom river is the most considerable on this part of the coast. It rises in the Lange Kloof range, which reaches 5,294 feet in height. It bursts from between high lands $3\frac{1}{2}$ miles from its mouth, and flows across a plain in a tortuous channel, in many places fordable at low water, and obstructed by sand banks; for the last $2\frac{1}{2}$ miles its course is parallel with the coast, and separated from the sea by a narrow sand strip. At high water it appears a large river, as much ground covers and uncovers with the tide. It is navigable for boats for about 8 miles, but the bar is only passable under favourable circumstances.

Bitan river is a small stream, moving sluggishly and winding along a broad plain. It joins the Kourboom about 2 miles from the mouth of the latter, and is fordable just above the junction.

The Coast.—From the mouth of Kourboom river, the coast for 5 miles is a sandy beach, backed by sand hills more or less covered with scant bush, which are at first bare and low, but thence rising to a height of 140 feet. Along this beach no landing should be attempted, as the sea always breaks heavily. At the east end of this beach is the Droog river, whence the coast becomes rocky, with intermediate sandy beaches, but the whole fronted by outlying rocks. This stream, as its name implies, is mostly without water.

Matjies river is one mile eastward of the Droog, and its mouth is often closed. It enters the sea from between high hills, and is bounded between high precipitous and wooded hills for some distance from its mouth.

Komkromma or Salt river lies $3\frac{1}{2}$ miles eastward of Matjies river; the coast between consisting of rocks and sandy beaches. About $1\frac{1}{4}$ miles eastward of the Matjies is the most off-lying cluster of rocks, which are, however, within a quarter of a mile of the shore; close to the eastward of Matjies river are two remarkable islets, 50 feet high; the shore here is dangerous to approach, though, at times, it is possible to land on the rocks. Abreast the rocks, the country is park-like, with wooded patches and gorges, and farther inland, forest.

The entrance of Salt river is said not to be difficult for boats, but the sea frequently breaks heavily off and about its mouth; directly inside it expands into a small lake. It is navigable for boats about a mile from the mouth, and appears to be a convenient place for wooding and watering.

COAST, General appearance.—Over the eastern point of the mouth of Groote river, which is about 11 miles eastward of cape Seal, is a double peak. The coast thence south-eastward to Aasvogel point, a distance of 37 miles, is formed of perpendicular cliffs, and rocky hills, 300 to 600 feet high. It is intersected by streams and gorges, with several outlying dangers at a short distance; it should not be approached nearer than one mile. In this extent of coast the numerous streams which empty themselves into the sea, take their rise in the Outeniqua mountains, but none of them are navigable for vessels.*

The Outeniqua mountains which in this locality back the coast at a distance of 4 to 8 miles continues eastward to about 7 miles north-east of Zitzikamma point. This mountain chain has several well-defined peaks, which from their appearance are very conspicuous and useful landmarks to seamen. Formosa peak and Thumb peak (so called from its appearance) each about 5,500 feet in height, are the highest and most remarkable.

Nearer the coast, and only 4 miles from it, the Grenadiers Cap, so named from its shape, is also conspicuous and 3,224 feet in height. Eastward 20 miles on the same range is Witte Els berg, a pyramidal peak, 4,098 feet in height; when seen from the eastward, and westward it shows a flat top.

Karedow peak, when nearly abreast, shows a saddle-shaped hill, but on other bearings a flat top, 3,009 feet in height. The end of

* See Admiralty chart:—Mossel bay to cape St. Francis, No. 2,084. The information from Groote river to Baashee river is chiefly by Nav. Lieuts. D. J. May and W. E. Archdeacon, R.N., 1866–68.

Outeniqua range, north-eastward of Zitzikamma point is very conspicuous, terminating in a sharp conical hill 1,634 feet in height, which drops suddenly to the plain, extending to the shores of St. Francis bay.

The Eland river range and Van Staden range of mountains north-eastward of cape St. Francis are also conspicuous, and in clear weather mount Cockscomb is a splendid object. The Van Staden range, which terminates suddenly, has a remarkable jagged top peak at its south-east extremity named Brak River hill, nearly 2,000 feet in height.

Groote river.—The entrance to this river, 2 miles eastward of Salt river, appears to be wider than the latter, and inside expands into a lagoon. A conspicuous hillock marks its eastern bank, from whence the land recedes curving eastward for 2 miles, with high wooded cliffs, as far as Blue Rock river, which may be known by the cliffs on the eastern side being bare and perpendicular. There are deep ravines in the land, and several other streams along the wooded coast as far as Storm river.

Storm river.—Wall point, $12\frac{1}{2}$ miles eastward of Groote river, is so named from its perpendicular appearance. Storm river, situated about 4 miles eastward of Wall point, is about 50 yards in breadth, and flows through a gap between perpendicular cliffs about 600 feet high. Some low shelving rocks on the western side partly shelter the entrance, and under favourable circumstances, landing may be effected in boats, a little inside the eastern point where there is a footpath leading to the forest ranger's house, 2 miles to the eastward. The point forming the eastern entrance is grassy, skirted by several rocks awash lying close to the shore.

There is no road between it and Plettenberg bay. Eastward of Storm river the forest loses its denseness. A sunken rock lies about $2\frac{1}{2}$ cables off shore at 3 miles eastward of Storm river.

Faure river, a small stream, lies 5 miles eastward of the Storm. A long patch of sunken rocks, on which the sea breaks in bad weather lies off the entrance ; its extremes bear S.W. $\frac{1}{2}$ W. eight-tenths of a mile, and S. by E. $1\frac{1}{10}$ miles from the west point of the river. At three-quarters of a mile eastward of the Faure is a white rock about 40 feet high.

Eland river, lying about 9 miles eastward of Storm river, is the broadest stream in this locality, and may be known by some white rocks a little inside a point on its eastern side of entrance ; a mile beyond this there is a conspicuous clump of trees on the apex of a

cliff near a gorge. There are many branches to the river, and its banks a little inland are covered with dense bush. Eastward of Eland river the cliffs are not so woody.

Robhoek or Seal Corner point lies $2\frac{1}{4}$ miles eastward of Elands river, and may be known by the land receding on each side, with a grassy face, sloping gradually to a rocky peak near the sea. One mile eastward of Robhoek point, the cliffs are nearly perpendicular with bare rocks cropping out of the bush, to a sandy cove, off which there are several rocks awash, at the distance of one cable. At $2\frac{3}{4}$ miles farther on is the mouth of the little river White Els ; thence sand skirted by rocks, extends along shore $1\frac{1}{2}$ miles to a high conspicuous white rock, with a ledge extending nearly one mile in a north-westerly direction ; the ledge covers at half tide. Continuing eastward to Aasvogel point there are several dangers awash lying a quarter of a mile from the shore. There are several farm houses about one mile inland.

Aasvogel or Vulture point may be known by the cliffs forming a hill, 660 feet high, with a strip of sand half a mile at the back of it ; a rock awash; lies one cable distant from the point.

Clarkson village.—At $2\frac{1}{2}$ miles westward of Karedow peak is a road through the mountain range, and at the same distance, to the south-eastward, is the village of Clarkson with a population of 500, and the Moravian mission.

From Aasvogel point the land forms a bight to a small stream 4 miles farther on ; the coast between is composed of cliffs, and appears clear of outlying dangers. At this stream the land is more elevated, rocks lie about half a mile from the shore, and there are sandy beaches as far as the mouth of Zitzikamma river. From a position 2 miles eastward of Aasvogel point to Klippen point, the shore should not be approached within 2 miles. .

ZITZIKAMMA RIVER, the entrance of which is closed, is easily identified by some sand cliffs nearly one mile in extent on its western side, the left end of which from the westward has the appearance of the letter Y. At the back of the sand cliffs the land rises to an elevation of 729 feet. The eastern side of the river is much lower than the western side, and there is a conspicuous round hill, 379 feet high, half a mile up the river, facing the entrance.

Close to the mouth of Zitzikamma river on the eastern side is a rock about 50 feet high with a cavern in it, locally known as the House rock ; thence to Zitzikamma point, the coast is formed by

several grassy ridges, fringed with rocks. There are many streams of fresh water in this locality.

Zitzikamma point is low and shelving, with rocks and breakers, extending nearly three-quarters of a mile from the shore. Eastward of the point the coast is composed of a succession of bushy hillocks 50 to 120 feet high, from the base of which, shelving rocks and breakers extend off about half a mile. The highest of the hills in the vicinity of the point is 596 feet.

A reef, awash at low water, lies upwards of half a mile from the westernmost of two conspicuous triangular bushy hillocks, with sand between them. At the base of the western, there are several high rocks, from whence the coast curves for two-thirds of a mile to Wreck point; two rocks awash lie close to this point.

Landing.—Just within Wreck point, there is a sand patch visible from seaward, and a conspicuous peak 560 feet high, on the ridge one mile inland. About half a mile eastward of the point there is a long ledge of rocks, the eastern part awash at low water, and forming a cove where at times landing can be effected. On the coast facing the extreme of this ledge, the top of one of the grassy hillocks is covered with sand. Within the cove long shelving rocks and big boulders appear at low water, and on the western part there is a little sandy beach.

Reef, or Klippen point, is a long, low, rocky point, with a cluster of rocks projecting two-thirds of a mile, in a S.S.E. direction; the outer rock is nearly awash at low water, and the inner one 13 feet above high water. Klippen point is 30 feet high, and has a grassy hill 68 feet high, a little to the northward of it. The point should not be approached within $1\frac{1}{2}$ miles. Eastward of the point is Slang bay.

SLANG BAY has on its western side low sand cliffs, 30 to 50 feet high, with patches of bush, and the shore is foul for half a mile north-eastward of Klippen point; in other parts the bay appears free from rocks, but a heavy surf rolls into it. Bare sand hills from 200 to 300 feet high, fringe the bay for 3 miles, whence it is blown by the strong westerly winds experienced along this coast, between two ridges to a distance of 6 miles inland. At the base of these hills there are several pools of fresh water formed between clumps of rocks cropping through the sand.

Slang river lies at the head of the bay, but its mouth is closed. Another small stream discharges itself into Slang bay three-quarters of a mile to the eastward of Slang river, and at the back of this, the

land gradually rises to a grassy ridge 596 feet high ; at 3 miles inland some white farmhouses, $2\frac{1}{2}$ miles east of the ridge, are conspicuous from the westward.

The coast eastward of the second river consists of wooded hills, 200 to 250 feet high, based by rocky cliffs, 10 to 20 feet high. White point, 30 feet high, so named from the whitish colour of the rocks, forms the western point of a sandy cove, which may be recognised by a stream of water and a conspicuous sand patch.

There is another cove three-quarters of a mile eastward of White point, formed by a rocky ledge a third of a mile in length, parallel to the coast ; it is encumbered with boulders, which cover at high water, when, under favourable circumstances, a boat may land and fresh water be obtained.

Thys bay.—Thys point forms the western point of Thys bay. It is 50 feet high, with low, shelving, and sunken rocks, extending one-third of a mile in a south-easterly direction. Thys bay is a sandy bight about one mile in breadth and apparently free from rocks ; low sand hillocks fringe the bay, and at the eastern end there is a sand hill partially topped with bush, 366 feet high ; here the sand is blown inland to a distance of 2 miles, forming a conspicuous stripe when seen from seaward. At the back of this sand hill is a pool of fresh water.

The shore from Thys bay trends in a south-east direction, and is rocky and rugged, with grassy cliffs from 50 to 110 feet high. From Slang bay to cape St. Francis there are numerous ridges of wooded hills extending in an east and west direction across to Krom bay, with grassy vales between ; the highest hill is 419 feet high.

Scholtz Kraal is a cliffty cove, 2 miles eastward of Thys bay ; in it there are several rocks, and at the head a small waterfall. Near the summit of the ridge, about half a mile from the coast, a farmhouse is visible. In the vicinity of Scholtz Kraal, rocks awash, extend a quarter of a mile off-shore, and in a rocky bight, $1\frac{1}{2}$ miles south-east of the Kraal, H.M.S. *Osprey* was wrecked in 1867. At this bight the grassy cliffs and hills decrease in elevation, the shore is straight, and fronted with rugged rocks, 10 to 30 feet high.

SEAL POINT is a rocky projection, lying 2 miles westward of cape St. Francis ; off the point there are three rocks nearly awash, and at half a mile S.E. by E. from it there is a reef half a mile in extent, on which the sea breaks heavily in bad weather.

Between Seal point and cape St. Francis, the coast forms a bay about half a mile deep ; its shores are rocky, with large boulders, but

at its head there is a low sand beach, in front of a ridge of bushy sand hillocks varying from 30 to 70 feet in height.*

CAPE ST. FRANCIS LIGHT.—At about 250 yards within the extreme of Seal point is a stone light tower, 102 feet high, and painted white, with keeper's dwelling attached. From the tower is exhibited at an elevation of 118 feet above high water, a *flashing* white light at intervals of *twenty seconds*, and should be visible in clear weather from a distance of about 16 miles. The light shows *red* between the bearings of S. 30° W. and S. 83° W., over Krom bay, excepting where the hill tops intervene. In consequence of the want of sharpness in the change from red to white, it may appear red near the bearing of West ; but this red light will not be seen from a vessel passing a safe distance along the coast, and if seen warns the mariner of his dangerous approach to the shore.

Telegraph.—There is a flagstaff and signal station near the light-house, which is in telegraphic communication with the ports of the colony.

Cape St. Francis is the most prominent point along this coast, and its position may be known by mount Cockscomb, which bears about N.N.E. from it, and by the extensive plain inshore, on which at a distance of 10 miles from the cape, may be seen the village of Humansdorp. See description of mountains, p. 97, 98. At the back of this village are two remarkable mountains, the nearest one, Kruisfontein, 2,574 feet high, has a double peak ; the other has a single peak and named from its appearance Sharp peak ; from the eastward and westward cape St. Francis appears as two bushy hummocks with a bare sand ridge between ; the northern hummock is 140 feet high, and the southern 110 feet high.

Immediately off the cape are two rocks 11 feet and 9 feet above high water, with low water rocks between, terminating in a reef extending about 2 cables in a S.S.E. direction.

Vessels from the westward, rounding cape St. Francis, should give Seal point a berth of 2 miles, and not bring it to bear westward of N.W. by W. $\frac{1}{2}$ W. until the high sand hill in Krom bay, or the western end of beach, is well open eastward of the cape.

KROM BAY is formed between cape St. Francis and Zeekoe point (Sea cow), a distance of 7 miles. It affords good anchorage in 10 fathoms over a sandy bottom, with cape St. Francis bearing S.W. $\frac{1}{2}$ W. distant about 2 miles, and about the same distance off the

* See also Admiralty chart :—Cape St. Francis to Waterloo bay, No. 2,085 ; scale $m = 0\cdot3$ inches.

mouth of Krom river. Krom bay affords good shelter in westerly gales, but it cannot be considered safe with easterly winds, though it is said to be as safe as Algoa bay.* South-west winds are the worst for swell. There is generally a heavy surf along the beach, but with westerly winds landing may be effected at the western end of the beach, or on the rocks forming that extreme of the bay. There are several farmhouses in the neighbourhood of Krom bay, whence supplies may be had.

From cape St. Francis the coast for $1\frac{1}{2}$ miles is rocky, irregular, and backed by grassy hills partially covered with bush. There are two rocks, 4 feet above high water, about 100 yards from the shore, with a small ledge extending from them ; with these exceptions the coast is clear of outlying dangers.

Landing.—At the above distance, the sand hills, 200 feet in height, commence, the base of which is fringed with rocks and boulders for about three-quarters of a mile to the beginning of the sandy beach ; at this point a long ledge of boulders uncover at low water, under which is one of the best places for landing.

The coast between these boulders and Zeekoe point, in extent about 7 miles, is formed by bushy sand hillocks, and fronted with a sandy beach, which to the westward of Krom river, is flat and free from rocks. The highest hillock between Zeekoe point and Krom river is 67 feet, and just behind it there are the ruins of a fishing establishment, and a spring of fresh water.

Tides.—It is high water, full and change, in Krom bay at 3h. 34m. : springs rise about 5 feet. South-east winds reduce the height, and north-west winds cause a corresponding rise. The barometer falls before north-west winds, and rises on the approach of south-east winds.

Krom or Crooked river is not navigable. At low water there is one foot on the bar, and the mouth is contracted to a breadth of about 33 yards, but at high water, the sand being very flat, the river presents an entrance, about 2 cables in width ; within the entrance the water is deeper. There is a ford about 2 miles from the mouth, and near it are several farm houses where supplies may be obtained.

Humansdorp.—The village of Humansdorp stands north, $7\frac{1}{2}$ miles in a direct line from the mouth of Krom river, on the main road between Cape town and port Elizabeth, and contains a population

* Skead.

of about 2,000 ; it gives its name to the district, has postal communication with all parts of the colony, and is 56 miles from port Elizabeth, with which and Cape town it is connected by electric telegraph. Ostrich farming is carried on with marked success. The village is conspicuous from seaward.

Zeekoe (Sea Cow) river, lying $4\frac{1}{2}$ miles eastward of Krom river, is broad but generally closed. At three-quarters of a mile from its mouth the river divides into two branches, the western taking its rise near Humansdorp. The water is fresh at about 2 miles from the sea. The hillocks fringing the intervening coast are about 100 feet high, and there are numerous rocky ledges projecting from the sandy beach, all of which nearly cover at high water.

Zeekoe point, 102 feet in height, lies half a mile eastward from Zeekoe river, and is formed by the bushy sand cliffs receding, which give it a conspicuous appearance. At $1\frac{1}{2}$ miles northward of the point in a sandy bight between two projecting ledges, there is a fishing establishment, named Jeffrys bight, after the person who first settled there. Here is a large two-storied white building and some cottages.

Landing.—Jeffrys bight is considered one of the best landing places in fine weather.

Noors Kloof point lies $1\frac{1}{2}$ miles north-eastward of Jeffrys bight, and is formed by a wooded hillock near the termination of a back ridge of hills. The beach northward is comparatively free from rocks.

Kabeljou river, a small stream closed at its mouth, lies about 2 miles northward of Noors Kloof point; immediately to the westward of it the sand hillocks are low and nearly bare. The frontier road crosses the river about one mile from its mouth, and at this place fresh water may be obtained. At 2 miles eastward of Kabeljou river, the bare sand in many places overtops the coast hillocks, which range from 50 to 80 feet in height. The back land for 3 miles forms a flat, and nearly midway to Gamtoos river there are some conspicuous farm buildings at one mile from the beach.

Gamtoos river lies at the head of St. Francis bay. The bar is nearly dry at low water springs, but there is deep water inside, with an ebb and flow 8 miles from the sea ; a ferry from the main road crosses it 3 miles from its entrance. The right point of the river is formed by low sand hills, but on the opposite side the hills form bluffs, which are conspicuous from seaward.

Eastward of Gamtoos river the bare sand hills increase considerably in elevation, forming ridges nearly perpendicular to the coast ; at the back the land is high and rugged, attaining an elevation of 900 feet at a distance of 3 miles.

A bare sand hill, with a square top 320 feet high, and 7 miles eastward of Gamtoos river, is remarkable, and readily identified by some bush about halfway down its slope.

Van Stadens river, also closed at its mouth, is 9 miles eastward of Gamtoos river, and may be known by the high sand hills which form a saddle sand peak on its western side.

The coast between Van Stadens river and Maitland river is formed by bushy sand hills and beach overtopped by a grassy ridge, with patches of cultivation 700 feet above the sea. The abrupt termination of the Van Staden range of hills, and a double peak nearly 2,000 feet high 5 miles inland of these two rivers, are also good marks for identifying this locality.

Maitland river may be identified by the sand extending some distance inland at its western side, forming a conspicuous round hill and by another high sand patch, about $1\frac{1}{2}$ miles eastward of it ; like all the other rivers it is dry at its mouth. There are several farms, along the banks, and lead has been found in a mine about 2 miles from its mouth.

The coast from one mile eastward of the Maitland is backed by a ridge of grassy hills, studded with trees, and fronted with shelving rocks, and occasional patches of sand, to a point lying 4 miles distant, off which there is a peaked rock and several hidden dangers extending about a quarter of a mile from the shore. In the bight to the eastward are several streams of fresh water and a conspicuous wooded peak 220 feet in height.

About one mile eastward of the bight is a conical wooded peak 172 feet high, and farther on is Glassen point.

Gassen point is fronted by a rocky ledge to the distance of half a mile, on which the sea breaks with violence during heavy gales. The cliffs are formed by the termination of bushy hills about 150 feet in height. One and a half miles inland there are two hills ; the western one is wooded, but the top of the eastern one, named Lovemore hill, 690 feet above the sea, is bare, with a conspicuous clump of trees near its western slope.

Coast.—At 4 miles eastward of Lovemore hill, near the eastern extremity of a wooded ridge, is Buffels Fontein or Botha Kop

elevated 915 feet above the sea ; it has a bluff termination, and near it are several buildings.

At one mile E.S.E. of Glassen point, the cliffs form another wooded peak 172 feet above the sea ; the beach is sand, and a rocky ledge extends from it in a southerly direction about a quarter of a mile. The coast eastward forms a sandy bay 2 miles in length, backed by wooded hillocks. In the western part of this bay there are several ledges of rocks, but in the bight, where there is a conspicuous triangular patch of sand, about 60 feet in height on the cliff face, it is clear. One mile farther eastward, a belt of sand, about 2 miles wide, extends in an easterly direction for 6 miles to near cape Recife, which is very conspicuous. The shore in places is skirted by a rocky ledge to the distance of a quarter of a mile.

Chelsea point lies about 4 miles westward of cape Recife ; the point is shelving with several conspicuous grassy hillocks, the highest being 103 feet above the sea ; at the back are some high sand hills. Off the point there are two rocks above high water and a number of hidden dangers ; from the outer extreme of these dangers, the highest hillock, half a mile eastward of the point, bears North, distant two-thirds of a mile. Between Chelsea point and cape Recife the land forms a bay nearly one mile deep, fringed with rocks and hidden dangers. Bare sand hills extend all along the coast with occasional clumps of bush.

GENERAL DIRECTIONS.—From cape Seal (p. 94) to Zitzikamma point the shore should not be approached within a distance of 2 miles, or at night and in thick weather a vessel should not stand into less than 45 fathoms. Thence to cape St. Francis the same distance should be preserved in daytime, but at night and in thick weather, owing to the irregularity of the depths and the probability of the current setting directly on to the shore, it should not be approached in less depths than 70 fathoms. Being well eastward of cape St. Francis and thence to cape Recife the same distance must be observed in daytime, and at night until the vicinity of Glassen point is approached, the vessel may go into 45 fathoms, but in thick weather and at night no nearer to cape Recife than into 60 fathoms.

CURRENTS.—**Caution.**—A current at times sets directly on to all this part of the coast or in a north-east direction ; seamen should therefore avoid hugging the land at night or in bad weather, when bound either east or west ; more especially as dense fogs occasionally prevail. From cape Agulhas eastward to Buffalo river the current

has been known not only to set to the westward along, but towards the coast, more particularly opposite the bays.*

A weak current runs to the eastward near the shore all along the coast between cape Seal and cape Recife, but in the offing, as a rule, the Agulhas currents sets to the westward at a rate of from one to 2 miles an hour ; and off the edge of the bank of soundings as much as $3\frac{1}{2}$ or 4 miles. In westerly gales there is much less sea on the Agulhas bank than there is southward of it.

* See currents on pages 21–23.

CHAPTER IV.

CAPE RECIFE TO CAPE MORGAN.

(Long. $25^{\circ} 42' E.$ to long. $28^{\circ} 22' E.$)

VARIATION IN 1889.

| | | | | | | |
|---------------|---|---|---|---|---|---------------------|
| Cape Recife - | - | - | - | - | - | $29^{\circ} 40' W.$ |
| Buffalo River | - | - | - | - | - | $29^{\circ} 0' W.$ |

ALGOA BAY is formed between cape Recife and Woody cape which are 33 miles apart in an east and west direction. In the south-west corner of the bay is port Elizabeth, off which there is usually safe and convenient anchorage at all times of the year, but like other bays on this coast, it is subject to the full force of the south-east gales that blow so violently at times during the months of October to April.

Cape Recife, the western extreme of Algoa bay, projects to the south-eastward and terminates in a low point. On the cape is a stone lighthouse, and to the north-west of it is the hillock of Recife, which is the higher of the two, and is often seen some time before the lighthouse is made out.*

In approaching the land from the southward during daylight, cape St. Francis has been mistaken for cape Recife, but they may be distinguished by the hillock above mentioned, which appears at a distance as the termination of the coast line, and by a remarkable strip of bare white sand of considerable extent, immediately to the westward of the hillock, extending horizontally, and appearing like a

* See Admiralty charts :—Hondeklip bay to port Natal, No. 2,095 ; cape St. Francis to Waterloo bay, No. 2,085 ; Algoa bay, including Bird islands and view, No. 642 ; scale, $m = 1\cdot0$ inches ; and plan of port Elizabeth, No. 641 ; scales $m = 4$ inches and $9\cdot6$ inches.

beach : also from the fact that cape St. Francis lighthouse is coloured white, while that of cape Recife is painted in red and white horizontal bands.

Thunderbolt reef, on which H.M.S. *Thunderbolt* was wrecked in 1847, lies about three-quarters of a mile from the pitch of cape Recife, with the lighthouse bearing about N.E. $\frac{1}{2}$ E., and the sea generally breaks heavily upon its jagged rocks, which are often plainly seen ; but at high water and in fine weather this may not occur. There is a decided indraught towards this reef and the extreme of the cape, and no sailing vessel should attempt to approach either, except with a commanding breeze, within the distance of 2 miles.

Caution.—As the depths about the cape and reef decrease very suddenly from 10 fathoms, vessels should not go into less than 12 fathoms, by night or day.

LIGHTS.—Cape Recife.—From a lighthouse 80 feet high, painted in red and white horizontal bands, on cape Recife, is exhibited at an elevation of 93 feet above the sea, a white light, *revolving* every minute, and visible from seaward in clear weather from a distance of about 15 miles, between the bearings of East, through north and west to S.W. $\frac{1}{2}$ S. ; between the bearings of S.W. $\frac{1}{2}$ S. and S. by W., it shows *red*, to warn vessels of too near an approach to Dispatch rocks.

At port Elizabeth, on a hill at the back of the town, S. $\frac{1}{2}$ E. distant 25 yards from Donkin monument, is a stone colour lighthouse 55 feet in height, from which is exhibited at 225 feet above the sea, a *fixed* white light, visible between the bearing of N.W. by W. to S.W. by W. from a distance of 12 miles in clear weather. Between the bearing of N.W. and N.W. by W. ; also between S.W. and S.W. by W. the light shows *red*. In consequence of the greater elevation of port Elizabeth light, in certain conditions of the atmosphere, it may be seen by vessels coming from the eastward, before the light on cape Recife.

At the extremity of the North jetty is a light which shows *green* seaward through an arc of 150°, or between the bearings of N.W. and S. by E. $\frac{1}{2}$ E., and *white* inshore of these bearings.

To the south-eastward, the junction of the green and white sectors leads seaward of the foul rocky ground known as Strutt reef and of the remains of the old breakwater ; to the northward the junction of the sectors warns of a too near approach to the sea wall—so that, alteration in the colour of the light from green to white on either side of the jetty, indicates that the line of safety has been passed.

A *white* light is shown at the end of the South jetty, and is obscured inshore of a South bearing; boats must not lose sight of this light until the outer end of the jetty is neared, to avoid the shoal ground off the old breakwater above mentioned.

A light is shown during S.E. gales, near the beach northward of the town. *See* port instructions page 114.

Telegraphic communication exists between cape Recife and cape Francis lighthouses, and port Elizabeth, and thence to other places in the Cape colony. Vessels can be reported on the signal being made. In cases of distress a steam tug can be requested from port Elizabeth.

Beacons.—A stone beacon, 25 feet high, painted red, is situated about 500 yards N.N.E. of Recife lighthouse. Two other stone beacons are situated about $2\frac{1}{2}$ miles northward of cape Recife, near Beacon point, E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., 1,200 yards from each other, to mark Dispatch rock. They are each 25 feet high, surmounted by a ball, and painted in alternate bands of red and white.*

Shoals.—**Dispatch or Roman rock** lies nearly one mile off shore, and 3 miles northward of cape Recife; with a least depth of 8 feet. It is steep on its eastern side, and should not be approached within a distance of 2 cables. From the shoalest part, cape Recife red beacon is in line with the lighthouse, and the two beacons on Beacon point are in line bearing W. $\frac{1}{2}$ S.

Riy bank is about one mile in extent, composed of uneven rocky ground, with depths of from 6 to 14 fathoms, and the sea breaks heavily over it after S.W. gales. The shoal spot of 6 fathoms lies E. by S. $\frac{1}{2}$ S., distant $8\frac{1}{2}$ miles from cape Recife lighthouse.

Strutt reef, with 15 feet at low water spring tides, is about 50 square yards in extent, and lies to the southward of the anchorage and 3 cables off-shore, with the magazine bearing W. by S. $\frac{1}{2}$ S., and the lighthouse on South jetty N.W. by W. Port Elizabeth lighthouse in line with the tower of the town hall, bearing N.W. $\frac{1}{2}$ W., leads one cable northward of Strutt reef, in about $3\frac{1}{2}$ fathoms.†

PORT ELIZABETH.—**Town.**—The town of port Elizabeth is named after Lady Elizabeth Donkin, to whose memory an obelisk, 210 feet high, is erected on a hill overlooking the town and sea; her husband, Sir Rufane Shaw Donkin, arrived here in April 1820, for the purpose of locating the British settlers. Then there were but a few huts; now the town contains a population of about 13,000, and is

* The information about Algoa bay is by Dayman, Simpson, and Skead, R.N.

† See Admiralty plan of port Elizabeth, No. 641; scale $m = 4$ inches.

fast increasing in size and importance. It is the principal seaport of the eastern portion of the Cape colony, and its geographical position with reference to the other States, and as a port of call or refuge for vessels from the East, renders it a place of much importance.*

The principal buildings are the town hall, library, provincial hospital, the Grey Institute, London and South African and Standard banks, St. Patrick's, Oddfellows', and Good Templars' halls, Masonic temple, the wool and produce market, gasworks, custom house, and other handsome buildings, together with numerous churches and other places of worship within the town and environs. There are also two parks, one named St. George, the other Prince Alfred.

Exports, &c.—The exports consist of wool, hides, ivory, beeswax, sheep and goat skins, ostrich feathers, tallow, angola hair, &c.

In the year 1885, 494 vessels, amounting to 767,000 tons, entered, foreign and coastwise. In the same year the value of the imports was £1,681,293, and that of the exports £1,483,852.

Landing jetties.—The north jetty at port Elizabeth is about 300 yards in length, with a depth of 14 to 22 feet alongside at low water; it is situated about $2\frac{1}{2}$ cables northward of the entrance to Baakens river. The south jetty is about 250 yards in length, with about 14 to 18 feet alongside, and lies about 4 cables south-eastward of the north jetty. The lights exhibited from these jetties are described on page .

Landing can generally be effected, but not in very heavy weather. A red ball is hoisted at the north jetty when landing is dangerous.

In the space between the jetties are the remains of the old breakwater, with about 5 feet water over it. Boats must not pass over this dangerous ground.

Lights.—See page 109.

Supplies.—Supplies of all kinds are plentiful, and moderate in price. Fish may be caught in abundance, and oysters are to be obtained at low water springs.

Repairs to machinery may be effected, there being two engineering firms here. Shafts of 6 to 8 inches diameter can be turned, castings of $1\frac{1}{2}$ tons made, and cylinders of 36 inches cast and bored. Tugs are available, and steam launches attend on the shipping. No facilities for docking.

Coal can be obtained at about 40s. per ton; 3,000 to 4,000 tons usually kept in stock. It is shipped by means of lighters of 30 to 90

* See Admiralty plan of port Elizabeth, No. 641; scale m = 4 inches

tons burthen. The jetties are fitted with steam cranes, lifting from 2 to 10 tons, and are connected by rails with the coaling stores.

Water is obtained from pipes at the end of the pier, and is put alongside vessels in the bay at 7s. 6d. per 250 gallons.

Communication.—See page 8.

Time Signal.—A black ball is dropped at port Elizabeth lighthouse on the hill, at 1 p.m., mean time at the cape of Good Hope, corresponding to 11h. 46m. 5³s. mean time at Greenwich, every day, Sundays and public holidays excepted. If anything occurs to prevent the ball dropping at the proper time, a chequered red and blue flag will be shown from the upper window of the lighthouse, and the ball will be dropped at 1h. 5m. cape of Good Hope time. The position of Lady Donkin's monument (close to the lighthouse) is lat. 33° 57' 43" S., long. 25° 37' 24" E.

Anchorage.—An inner anchorage off the town of port Elizabeth in about 6 fathoms water, grey sand over clay, may be taken with fort Frederick bearing West, and Bird rock at Beacon point S. $\frac{3}{4}$ E. An outer anchorage equally good for large vessels is in 8 fathoms, similar bottom, with the fort on same bearing, and Bird rock S. by W.

At night anchor with port Elizabeth light bearing about W. $\frac{1}{2}$ N., in 8 fathoms.

The port captain determines the berths for merchant vessels, and ships of war should take the precaution in the summer season, when East or S.E. gales may be expected, to anchor with plenty of room to veer. The holding ground is good, and with the ordinary ground tackle of vessels of war, there is not much danger in riding out these gales.

It is the practice of merchant vessels regularly trading for wool cargoes to moor on arrival, and to strike their top-gallant masts, and unbend sails. They are found with ground tackle superior to ordinary merchant vessels, and usually ride out in safety the summer gales from the S.E. Nevertheless, in S.E. gales of unusual severity, vessels at times break from their anchors and are stranded, with loss of life. In a S.E. gale occurring on 31st August, 1888, 9 vessels out of 11, anchored in the road, were driven ashore. See remarks on the weather, page 113, and par. 5 and 10 of the Port Instructions pp. 115, 116.

Tides.—It is high water, full and change, at port Elizabeth at 3h. 10m., and the rise is 6 feet; the tides are often irregular, being acted upon by the wind. The surface stream is uncertain in direction and inappreciable.

DIRECTIONS.—Coming from the westward and having rounded cape Recife (page 106) at the distance of about 2 miles, steer N. by E., taking care to keep the red beacon on cape Recife well open westward of the lighthouse, until northward of the line of the two beacons near Beacon point, or Beacon point bears W. by N., to avoid Dispatch or Roman rock, when a vessel may steer for the anchorage.

There is seldom any advantage in passing between Dispatch rock and the mainland, and no large vessel should attempt it.

A strong indraught will often be felt after passing cape Recife and Thunderbolt reef, and allowance must be made for it in passing Dispatch rock.

At Night.—As the light on cape Recife is not visible to vessels coming from the westward, when bearing southward of East, it is necessary in making the light, before arriving within the distance of 5 miles of it, that it should be brought to bear northward of East. Round the cape at a distance of 2 to 3 miles, and in not less than 15 fathoms water, bearing in mind the strong set towards the cape and Thunderbolt reef, and when the light bears N.W. steer N. by E., taking care not to enter the ray of *red* light shown from cape Recife lighthouse ; when port Elizabeth light is seen, which will first appear *red*, and bear N.W., a vessel will be clear of Dispatch rock, but should continue on across the *red* into the *white* light, which will be first seen bearing N.W. by W., and thence to the road, steering about N.W. $\frac{1}{2}$ N., and anchoring in about 8 fathoms, with the port light bearing about W. $\frac{1}{2}$ N.

In working in, or coming from the eastward, a vessel should keep in the white light of port Elizabeth. *See lights, page 109.*

Leaving.—Vessels leaving Algoa bay and proceeding eastward, are recommended to take Bird island passages in fine weather, *see page 120.*

WINDS and WEATHER.—Easterly and S.E. gales, which alone are to be apprehended in Algoa bay, occur in the summer months from October to April ; the worst weather usually happening during these two months, that is at the commencement and close of the season. In the winter months the wind seldom blows from these quarters, except in rare instances, when what is called a black south-easter comes on, with rain and thick weather, of which the appearance of the sky and sea gives sufficient warning. The black south-easters are more frequent in spring (October and November) ; they do not last long but at times are violent.

The approach of the summer gales is to a certain extent foretold by the irregular oscillations of the barometer, which, although constantly high, in comparison to what it would be under similar circumstances in westerly winds, falls before the increase of wind. A damp cold air prevails, and there is a constant hazy appearance about the horizon, the upper parts of the sky remaining clear. When signals to prepare for foul weather are made from the port office, sailing vessels with doubtful ground tackle should get under way, making their first tack towards St. Croix island.

With the gale at its height a heavy and dangerous breaking sea rolls in ; but it has been observed that vessels with plenty of cable ride easily ; and, from the strong easterly current which prevails near the shore during these gales, it is probable that a powerful undertow assists to relieve the strain. It is also stated that, should the reading of the barometer be 30·5, and cirrus clouds appear, a south-easter will set in before 24 hours have elapsed ; or if the hills to the northward of port Elizabeth be obscured by haze a gale from south-east may be expected.

Port Instructions.—1. In the case of vessels about to discharge or receive on board any considerable quantity of cargo, a convenient berth will be pointed out by the harbour master, as close to the landing place as the safety of the vessel and other circumstances will admit. The vessel must then be moored with two bower anchors, with an open hawse to the south-east, and special care taken not to overlay the anchors of other vessels, or in any way to give them a foul berth. But all vessels not provided with anchors and cables according to Lloyd's scale of tonnage are to be anchored to the northward of the other vessels until so provided.

2. In the case of vessels touching for water and refreshments, they may ride at single anchor, but they must then anchor well to the northward, so as to prevent danger (in case of drifting) to the vessels moored ; and it is particularly recommended, when riding at single anchor, to veer out 70 or 80 fathoms of chain ; the other bower cables should be ranged, and the anchor kept in perfect readiness to let go.

3. Strict attention must be paid to keep a clear hawse (when moored), the more so when it is probable the wind may blow from the south-east ; and whether at single anchor or moored, the sheet anchor should be ready for immediate use. The situation of the vessel must be taken by landmarks and the depth of water ; and should any accident occur by which she may drift from such situation or lose her anchors, the same must be notified in writing to the harbour master.

4. It is recommended that vessels be kept as snug as possible, especially such as have to remain some time in the anchorage, for the periodical winds blow occasionally with much violence. Top-gallant masts and yards should be sent on deck, but topsails, courses, &c., should be kept bent and reefed, until the vessel has become so much lightened as to leave her no chance of working out in case of parting, when they should be unbent and repaired, if necessary, and bent again as soon as there is sufficient cargo on board to render the vessel manageable under sail.

5. To prevent the north jetty being injured by vessels driving foul of it in south-east gales, it is ordered that no sailing ship shall anchor to the southward of a line drawn from the harbour lighthouse through the north jetty end. If from any cause a vessel should anchor southward of these lines she must shift her berth in accordance with these instructions as soon afterwards as circumstances will permit. A green and white light is shown at the end of this north jetty, as a guide to boats landing at night.

Masters of vessels are especially warned of the danger of housing top-gallant masts, instead of sending them on deck, a practice which disastrous wrecks have shown to be very likely to endanger vessels, by precluding the possibility of the topsails being hoisted to enable them to beat out.

6. All vessels lying in this port shall show a light at night, as prescribed in the Board of Trade Regulations for preventing collisions at sea.

7 When it becomes necessary for vessels to veer cables in a strong breeze, they must always heave in again to their original scope, immediately on the return of moderate weather.

8. All signals made from the port office must be answered from the shipping, and strictly obeyed, and any vessel disregarding them will be reported to Lloyd's, as also to the owners.

9. In a case of a vessel parting from her anchors, and being unable to work out, it is recommended to run her for the sandy beach to the northward of the town, directly in front of the gashouse, at the north end of the sea wall, on the chimney of which, at 45 feet above the sea, a powerful gaslight is shown during S.E. gales, as a guide to vessels that part from their anchors during the night, keeping the headsails set even after striking, for the purpose of assisting in grounding the vessel firmly. No person should attempt to quit the vessel after she has taken the beach, until the lifeboat arrives alongside, or a communication is established with the shore by means of the life saving apparatus or otherwise.

10. On all occasions where it may be considered unsafe to land, a ball will be hoisted at the yard-arm of the port-office flagstaff, and it is recommended that ships' boats should never attempt it. A red ball is shown at the north jetty when it is dangerous for ships' boats to land.

Vessels can make their wishes known to their agents in bad weather, through the port office by the International Code. Vessels not having the code, can make the following signals with their ensigns :—

1. Ensign in the fore-top mast rigging - I am in want of a cable.
2. Ensign in the main-top mast rigging - I am in want of an anchor.
3. Ensign in the fore rigging - - I have parted a bower cable.
4. Ensign in the main rigging - - I am in want of an anchor and cable.
5. Wheft where best seen - - - Send off a boat.

The following signals will be made to vessels that may be stranded, from the most convenient point :—

At night.—By means of transparent figures.

By day.—By means of white figures on a black board.

No. 1. You are earnestly requested to remain on board until assistance is sent ; there is no danger to life.

No. 2. Send a line on shore, by cask, and look out for a line by rocket or mortar.

No. 3. Secure the line, bend a warp or hawser to it, for us to haul on shore, taking care to secure the warp well on board.

No. 4. Prepare to haul on board the end of the warp, which we will send you by means of the line, and secure it well.

No. 5. Lifeboat will communicate at low water, or as soon as practicable ; have good long lines ready for her, and prepare to leave the vessel ; no baggage will be allowed in the lifeboat.

No. 6. Secure the warp to the lower masthead, bowsprit end, or some other convenient place, and send a hauling line to us, that we may get you on shore by means of a traveller.

ANSWERS TO THE ABOVE.

By day.—A man will stand on the most conspicuous part of the vessel, and wave his hat three times over his head.

By night.—A light will be shown over the side of the vessel, where best seen.

GENERAL SIGNALS TO BE MADE FROM THE PORT OFFICE.

- No. 11. Union Jack over No. 1, Marryatt, white, pierced blue. } Prepare for bad weather.
- No. 12. Union Jack over No. 2, blue, white, blue (horizontal) } Veer cable.
- No. 13. Union Jack over black, black ball with No. 2 below } Veer to a whole cable.
- No. 14. Union Jack over No. 3, white and red (vertical) } Send top-gallant masts on deck, point yards to the wind, and see all clear for working ship.
- No. 15. Union Jack over No. 4, blue triangular with white cross } Strike lower yards and top-masts.
- No. 16. Union Jack over No. 5, red } Hoist a light during the burgee. night.
- No. 17. Union Jack over No. 6, triangular blue, yellow, red (horizontal) } Heave in cables to the same scope as when first moored.
- No. 18. Union Jack over black ball - - Clear hawse.

The above signals may be also made at night, by showing the numbers prefixed to them in transparent figures. The answer will be a light at the peak.

Zwartkop river, about $5\frac{1}{2}$ miles north-eastward of port Elizabeth, has 6 feet on the bar at low water, but the surf is frequently heavy. The river is navigable for small vessels 8 or 9 miles up. Vessels may anchor off the Zwartkop, but will feel the swell a good deal.

ST. CROIX ISLAND was so named by Bartholomew Diaz, the first European who landed here. It is about 4 cables in length, north and south, by 2 cables in breadth, and the western peak is 195 feet high. Its surface is of nearly bare rock, steep-to on the north-east side, but less so on the opposite side, where there is stunted vegetation. Numerous penguins and gulls resort here, and it is occasionally used for a temporary stopping place by sealers when in search of seals, which frequent the adjacent rocks, principally the one named Jahleel island.*

There is fair anchorage at about 3 cables north of St. Croix island, in 10 fathoms, sandy bottom, with its west peak bearing S. by E. In this position the heavy tumbling sea caused by East and S.E.

* See Admiralty chart :—Algoa bay, No. 642.

gales is considerably broken, but the extent of sheltered anchorage is confined to a small space by the shape of the island. It is often found that the surf abreast the island and at the mouth of the Zwartkop river is high and dangerous after the prevalence of S.W. winds, and continues so for a longer period than on port Elizabeth beach.*

Brenton rock, a little more than one mile south-west of St. Croix, is 50 feet high, and does not much exceed one cable in length. It is boldest on its southern side, where it may be approached within half a cable.

Jahleel island is 3 miles westward of St. Croix, and about half a mile from shore, abreast of the Coega river; it is about $1\frac{1}{2}$ cables in length, 47 feet high, and may be approached within one cable. There is 6 fathoms water between it and the shore.

Coega river (pronounced Coohha), a little more than 5 miles from the Zwartkop, is barred at the mouth, and the water, which is salt, flows into a small lake.

Sunday river, about $9\frac{1}{2}$ miles eastward of the Coega, falls into the sea close to a remarkable rock named Read's monument.† The bed of this river is deep on the northern side, but the surf beats violently over the bar, which boats can rarely pass.

The Coast from Sunday river eastward to cape Padrone is formed by an unbroken and monotonous chain of sand hills, which extend inland one to $1\frac{1}{2}$ miles. Many of these hills rise to the height of 350 or 450 feet above the sea, and are quite bare. At the back of the sand hills the country rises into lofty elevations of 1,000 to 1,200 feet, covered with grass and dense forest jungle intermixed, but there are no remarkable objects to distinguish this part of the coast.

BIRD ISLANDS.—About 30 miles eastward of cape Recife, and nearly 5 miles southward of Woody cape, are the Bird islands, a cluster of low rocky islets, which would be dangerous to navigation were it not for the lighthouse, which stands on the largest of the group called Bird island, a name given by the survivors of the *Doddington*, East Indiaman, which was wrecked upon it in 1755. This island is the resort of numerous sea fowl, and is covered by an inferior kind of guano. It is 33 feet above the sea, about 800 yards

* The information about St. Croix and Bird islands is mainly by Skead.

† So named by Captain Moresby, in 1820, in remembrance of a midshipman of that name, who perished with three seamen whilst surveying this coast.

long, and 630 yards wide. No water is found on it, save what little is left in the hollows of the rocks after rain. Eggs are abundant at seasons, and a very palatable vegetable, not unlike spinach to the taste, grows on it. Fish are plentiful.*

LIGHT.—From a light tower on Bird island, 72 feet high, of stone colour, square and turreted, is exhibited at an elevation of 80 feet above the sea, a fixed *red* light, visible in clear weather from a distance of 14 miles.

Stag and Seal islets.—At about a quarter of a mile to the northward of Bird island are Stag and Seal islets lying in an east and west direction, and connected at low water. North-eastward of these islets are rocky patches extending east and west over a space of three-quarters of a mile, having $2\frac{1}{2}$ and 3 fathoms water; the middle rocks rise above water, and are named North patch. These dangers lie N.E. by N. about one mile from the lighthouse.

At about three-quarters of a mile westward of Seal islet are five black rocky islets, with a narrow passage between, having a depth of 2 fathoms. It is during very fine weather only that these islets are not surrounded with heavy breakers.

Rocks.—South-westward of Bird island there are three dangerous rocks, named West rock, Doddington rock, and East reef. The two former are awash, and the latter has $2\frac{1}{2}$ fathoms water, but the sea is seldom so smooth as not to break upon it. West rock lies with Bird island lighthouse E. $\frac{1}{2}$ S. distant $1\frac{1}{2}$ miles nearly. From the Doddington, the lighthouse bears N.E. $\frac{2}{3}$ E. $1\frac{2}{3}$ miles; and from the centre of East reef N.N.E. $\frac{4}{5}$ E. $1\frac{1}{4}$ miles. Close around West and Doddington rocks the depths are 10 to 14 fathoms, but East reef, covering a space of 2 cables east and west, is more dangerous, and has $2\frac{1}{2}$ to 3 fathoms water upon it.

Caution.—Between and around these rocks and islands the depths are irregular, and during heavy weather a tremendous sea rolls over the whole of this space, producing a surf truly terrific, the sea breaking in 8 to 10 fathoms water to seaward of the group. Altogether, this is one of the most dangerous parts of the coast, especially to a stranger, and when doubtful of the vessel's position, if eastward of cape Recife, do not go into less than 60 fathoms at night.

Anchorage.—The Bird island group affords indifferent anchorage on the northern side, the holding ground is not good, and the bottom

* See Plan of Bird islands and view on sheet of Algoa bay, No. 642.

is uneven. The best anchorage is with the lighthouse in line with North patch, in 8 to 10 fathoms water.

With S.E. winds, the lighthouse seen between Stag and Seal islands, in 10 or 11 fathoms, is a very good spot for shelter, but should the wind come strongly from the westward, it will be found necessary to shift berth to the eastward, anchoring with the Black rocks in line with Stag island, or a little open on either side of it, in from 8 to 10 fathoms. From this latter position H.M.S. *Geyser* drove to sea in a heavy W.S.W. gale, which shows the holding ground to be bad, as she had 75 fathoms of cable out at the time.

Landing.—Vessels loading here with guano usually anchored in the last mentioned position, as it was more convenient for their boats to come off. It frequently happens that there is no landing, the rollers setting in during calm weather as well as in a gale. After these have subsided, care is necessary in landing as the sea sometimes breaks heavily and unexpectedly right across the entrance to the space between the islands. The boat must be kept well to the eastward, clear of the shoal off the east end of Stag island. The lighthouse in line with the first or western rock that shows on the white guano patch at the east end of Bird island is the best direction to pull in upon, as it leads between the breakers on the spit and those off the end of Bird island. See sketch on chart No. 642.

Tides and Currents.—In the vicinity of the Bird islands no regular tidal stream was found, but the rise is the same as in Algoa bay. At the anchorage northward of the group the current sets generally to the eastward, and at one time, during a strong westerly gale, it ran east at the rate of $1\frac{1}{2}$ knots. It was, however, upon two other occasions of westerly gales, found setting to windward.

BIRD ISLAND PASSAGE.—Directions.—If bound from Algoa bay to the eastward, with favourable weather, the Bird island passage is recommended. The channel is 3 miles wide and clear of danger; a vessel will carry from 10 to 15 fathoms through, and may run along the land at a distance of 2 miles the whole way to the Buffalo river. By passing inside Bird islands the strong current to the south-west is avoided.

Vessels passing inside the islands during the night, particularly steam vessels, are recommended to keep nearer to the mainland than the group, as the land is higher and more readily discerned, and the constant roar of the surf more distinctly heard than the breakers on the rocky reefs of the group. The lead with care will indicate a too near approach to the main shore, and 12 to 15 fathoms is a safe depth.

in passing. A wide berth should be given to cape Padrone, off which foul ground extends half a mile nearly from high water mark. *See* directions continued, page 123.

In passing outside the group, no vessel should approach within 3 miles of the lighthouse, as no advantage is gained by it, and the currents, though not generally strong, are uncertain and irregular, both in strength and direction in the vicinity of the group.

If proceeding from Algoa bay to port Natal, steam vessels generally skirt the coast, but sailing vessels should keep about 100 miles from land, in order to avoid the strength of the Agulhas current.

THE COAST.—General appearance.—Woody cape.—The first break in the sandy feature of the sea coast occurs at Woody cape, 22 miles eastward of Sunday river, and abreast Bird islands. At this spot the sand-hills are covered with dark bushes; they present to seaward a series of decayed sandstone cliffs, fronted by a beach of rugged rock, which extends along shore for 2 miles, when the sand-hills are again met with, though not so high nor so bare as those to the westward. These reach as far as cape Padrone.

Fresh water is found at Woody cape, and about cape Padrone (page 123), welling out from the base of the sand-hills. By digging into the sand above high water mark, fresh water may be had nearly all the way along this portion of the coast.

From cape Padrone to Keiskamma point, a distance of nearly 60 miles, the coast is mostly backed with an irregular ridge of hills, faced with sand to a height of 100 to 250 feet, with the exception of the first 20 miles, in which space the sand is much lower. The coast is intersected with numerous streams, and the land near the shore presents a fine tract of pasture country with large patches of cultivation.

Seen from the offing off cape Padrone, the most remarkable features are Nanquas peak (985 feet above the sea), the high sand hills to the westward towards Woody cape, and the lowness of the sand to the eastward of the point; the peak, when seen from the southward, appears flat-topped, but proceeding eastward, the peak gradually assumes a conical form, and is the most conspicuous object on this part of the coast and one that will always be readily identified, being the only conical-shaped hill of any great height near the coast for upwards of 100 miles.

Bokness hill, about $3\frac{1}{2}$ miles eastward of Nanquas peak, is a long flat-topped bushy hill, and is remarkable, as from this hill to Glendower peak, about 13 miles further on, the land is much lower,

very uneven, and intersected with numerous ravines. When tolerably near in, False islet and Bushmen river east head become conspicuous ; the former resembling as its name implies, an islet. Karega and Kasuga rivers are also remarkable ; and from off the latter several houses are visible near its mouth.

Thence to Kowie point the only remarkable sand is that seaward of Glendower beacon peak, and a patch inland on the high bank of a stream westward of the peak ; the latter is conspicuous from a position well off shore to the southward and westward.

The castle-looking house on the west bank of the Kowie, Kowie river itself, and the village on the cultivated slope on the east bank, as also the extent of high sand-hills immediately east of the river, the high head over Riet point, Groefontein head, together with Nanquas and Glendower peaks to the westward, serve to identify this coast.

The high hills at Bathurst, and the range of mountains in the vicinity of Grahams town, are also conspicuous from seaward. From Riet point to Kleinemond river the sand-faced hills become again low, as also the land behind ; about midway are the Black rocks or Three Sisters, conspicuous when within 7 or 8 miles of the coast.

Proceeding eastward to Great Fish point sand-faced hills become high, and when within about $1\frac{1}{2}$ miles of the point there is a remarkable bare-topped sand-hill which may be easily recognised 10 or 12 miles off shore. Great Fish point is not prominent.

Thence to Fish river the coast is comparatively low as well as the land behind, which is an extensive grassy plain intersected with numerous ravines, and studded with patches of mimosa bush. The head on the east side of the river is peak-shaped, covered with dark bush, and is remarkable from seaward.

Farther on to Stalwart point the sand-faced hills are tolerably high, and about midway 2 or 3 miles inland are two remarkable peaked grassy hills, near the village of Maitland, and are visible from all directions. This, with the dark head over Stalwart point, Fish river head, the bare-topped sand-hill west of Fish point, Black rocks, and Groefontein head, renders this part easy to be distinguished. Proceeding eastward, the Umtata river sand hills, the Bequa river sand, with the high bare-topped sand hill westward of it, westward of which again is a dark patch of bush running some distance down the face of the hill,

* See Admiralty chart :—Cape St. Francis to Waterloo bay, No. 2,085. The information from cape Padrone to Bashee river is chiefly by Nav.-Lieut. W. E. Archdeacon, R.N., 1868.

together with a round topped grassy hill 527 feet high (N.W. about 4 miles from Bequa river) named Schietkop, are remarkable features to identify the coast.

Patos Kop, a square flat-topped grassy hill, 900 feet in height (on the west end of which is a remarkable single bushy-topped tree) rises north-westward from Kieskamma point, and nearly 9 miles from the nearest coast. This hill, with the round-topped hill N.N.W. of Kieskamma point, the head close over the point with the house on its summit, the bushy sand hillock near the extreme of the point, and the conspicuous bare sand westward of the point, as well as the Bequa and Umtata sand hills, serve to identify this locality.

GENERAL DIRECTIONS.—From cape Padrone (directions p. 121) to Bokness river the shore should not be approached nearer than 2 miles, beyond this to Kieskamma point not nearer than one mile, bearing in mind to give the rocks off Karega river, Fountain rocks off Kowie river, Riet point, Great Fish point, Stalwart point, Madagascar reef off Bequa river, and the rock S.W. of Kieskamma point a wide berth.

At night or in thick weather do not stand into less than 40 fathoms,

The 100-fathoms line of soundings is about 22 miles off cape Padrone but to the eastward gradually lessens its distance from the coast; abreast of Kieskamma point it is about 13 miles distant. The edge of the bank is steep, dropping from 100 to 200 and 300 fathoms. in less than a mile. The soundings on the bank, which is flat, are tolerably regular, the bottom being generally composed of sand and shells, though to the westward it is frequently found with black specks.

During westerly gales the sea is much smoother on than off the bank, the edge of which is thus generally well defined.

Currents.—The Agulhas current off this part of the coast from the Bashee river westward generally sets W. by S., or West, and varies in strength from one knot near the shore to $3\frac{1}{2}$ or 4 knots an hour near the edge of the bank.

A weak current sets to the eastward near the coast at uncertain times. Close to the shore an eddy current often sets to the eastward, but its rate seldom exceeds half a knot an hour, *see page 23*.

In calm weather, and off the edge of the bank southward and eastward of cape Padrone, the current in places has been observed running like a race or overfall.

CAPE PADRONE, situated 8 miles eastward of Woody cape, is formed of sand cliffs, exceeding 100 feet in height. The sand hills extend nearly a mile back from the cape and rise to a ridge of bushy

hills 340 feet in height, at the back of which again the land rises, and on which may be seen two or three houses.

The beach is fringed with rocks, extending half a mile on each side of the point ; off the point are several outlying rocks, some of which show at low water. The outer sunken rock lies S.E. $\frac{1}{2}$ S. nearly one mile from the high part of the sand cliff on the point, and 4 cables from the shore. The sea at times breaks with great force on these rocks.

At one mile east of cape Padrone, is a sunken rock, which generally breaks ; and off the sandy point eastward of it breakers extend about half a mile. At one mile further east is a rocky point, with a sunken rock at a short distance off ; outside the rock are several patches of shoal ground, on which the sea breaks in heavy weather. The outer patch lies South $1\frac{1}{2}$ miles from the point, with cape Padrone bearing N.W. $\frac{3}{4}$ W. $3\frac{1}{2}$ miles.

The shore continues fringed with rocks, and at a distance of $2\frac{1}{2}$ miles eastward of the sandy point is another long ridge extending nearly 3 cables from the beach. The breakers extend in bad weather off this part about one mile from the shore, and continue at about that distance for 2 miles to the eastward ; the shoalest spot appears to be W. by S. $\frac{1}{2}$ S. $2\frac{9}{10}$ miles from False islet. From abreast these breakers, the shore trends eastward to Bokness river, the mouth of which is closed. The coast ridge here attains a height of 100 feet, is covered with bush, and sand extends some distance up its sea face. From Bokness river to False islet the shore is sandy.

FALSE ISLET is a dark looking head, 85 feet high, extending in an east and west direction half a mile ; it is nearly perpendicular on its sea face, and is connected with the main land by a series of sand hillocks, the main ridge of beach hills being half a mile northward of it. When seen from seaward the head shows out against the white sand inshore, and resembles an islet.

There are several rocks around False islet which show at low water, the outer one bearing S.E. $\frac{1}{2}$ E. distant 3 cables from the southwest or highest part of the islet. At one mile farther eastward is another point, a dark looking rock, about 50 or 60 feet high. Between the two points is a small sandy bight with several outlying rocks, and S.S.E. $\frac{1}{2}$ E. distant 4 cables, from the high rock are some rocks awash at low water.

Reef.—A reef upon which the sea breaks heavily, formerly reported by several coasters, was seen from H.M.S. *Flirt*, 1886 ; it lies from one to 2 miles S. by E. to S.S.E. of False islet.

Bushmen River.—The mouth of Bushmen river is choked with sand and rocks but at high water the tide runs in. The southern point of the river is remarkable, being formed by a high cliff head extending 3 cables in an east and west direction with three irregular lumps on it ; it is connected with the main beach ridge by a neck of sand, against the back ground of which the dark rock shows out conspicuously.

Several patches of rocks extend from Bushmen river to beyond the mouth of the Karega. The eastern one is about one cable in extent, awash at low water, with the highest part of the point bearing W. by N. $\frac{7}{8}$ N. $1\frac{1}{4}$ miles, and Karega river mouth N.N.W. $\frac{2}{3}$ W. three-quarters of a mile ; about a quarter of a mile N. $\frac{1}{2}$ E. from this patch is another, also showing at low water, and about 2 cables long in an east and west direction ; the sea breaks for a considerable distance outside these patches.

Between Bushmen and Karega rivers the beach ridge is about 180 feet in height, covered with bush and partially faced with sand.

Karega river is generally open at high water ; off it are the patches of rock just described. At half a mile eastward of the Karega is a point with three black rocks. The beach ridge close behind is 190 feet high, covered with bush, and sand extends a short way up its sea face.

The shore eastward for 2 miles is fringed with rocks, the coast ridge rising to a height of 225 feet. At this distance is a dark bushy head 150 feet high, and immediately inland is a dark bushy conspicuous hill 346 feet above the sea. Off this part of the coast sunken rocks extend off nearly 2 cables.

Kasuga river is closed at its mouth ; there are some houses on the banks of the river, visible from seaward. From the entrance of Kasuga river to the next point eastward the distance is $1\frac{1}{2}$ miles ; the point projects from the beach ridge of hills, and forms a dark bushy head, 111 feet high. The beach is rocky, and off it are several sunken rocks 2 cables distant.

Ship rock.—About 3 miles eastward of Kasuga river is Ship rock, a black point 50 feet high. The coast ridge of hills are about 400 feet high, and sand extends up the face of the hills, against which Ship rock shows conspicuously.

From Ship rock to Kowie point is about $3\frac{1}{2}$ miles ; the beach at low water is fringed with rocks. For 2 miles from Ship rock the coast ridge continues about the same height and distance from the beach, the sand extending some way up its sea face in an irregular manner ;

the ridge then closes to the beach with a sand streak running up to behind the ridge, which from the westward is remarkable.

About two-thirds of a mile westward of Kowie point and a short distance from the coast are two sunken rocks.

GLENDOWER PEAK.—**Landmark.**—At the back of the beach ridge is Glendower peak, a high grassy head 622 feet above the sea ; it is tolerably steep on both sides, its western dropping to a small stream, which having no outlet soaks through the beach ridge. There is a conspicuous sand patch on the high part of the west bank of the stream, about a mile from the coast.

A stone beacon, 50 feet high, pyramidal in shape, upper part black, lower white, has been erected on Glendower peak, in order to distinguish this monotonous part of the coast.

Kowie point.—From Kowie point, which is low, the shore trends eastward about $1\frac{1}{2}$ miles to Salt Vlei point, westward of which is Salt Vlei bay ; to about midway the sandy beach is fringed with rocks, at which distance there are several outlying rocks 2 cables from the shore. At half a mile in-shore is a black bushy hill, 300 feet high.

A rivulet runs into Salt Vlei bay ; the land here is low and grassy, gradually sloping down to the beach, at a quarter of a mile from which is a large farmhouse, and on a small rise to seaward of the house is a flagstaff.

Salt Vlei point is low and rocky, and near its extremity is a small bushy sand hillock, 33 feet high, connected with the main beach ridge by a neck of sand. From the sandy point to the eastward rocks extend to the distance of one cable ; eastward of the point is a small bight fringed with rocks.

The beach ridge of hills extends to Kowie river, to which they drop abruptly ; they vary from 60 to 140 feet in height, are covered with bush, and the highest part is near the river.

KOWIE RIVER.—This river rises near Grahams town, 40 miles from its mouth, and is navigable for small vessels for about 5 miles, and for boats for upwards of 16 miles, the scenery being exceedingly beautiful and picturesque, the banks wooded to the water's edge, varied in the upper reaches above Mansfield with grassy slopes and high steep cliffs. Game is abundant, herds of buffalo still exist in Kowie bush, and bucks are numerous, particularly the bosch bok and blue bok. Fish of excellent quality is also abundant in the river, and off the Fountain rocks at the entrance. The Kowie is one of

the favourite watering places on the coast, the warm Agulhas current running down the coast from the southern tropic, moderating the cold of winter—frost being almost unknown—and rendering it a genial resort for invalids.*

The river originally emptied itself into an extensive sandy basin, the water thence forcing its way through a narrow channel on the eastern side into the sea. Its course, however, has been diverted at a point about a mile from the entrance, and now runs along close to the western shore between two stone embankments, of an average breadth of 70 yards. From abreast the signal staff, a stony bank extends 30 yards into the river, and its extreme is marked by a tripod beacon. Vessels of 13 to 14 feet draught can enter the river at high water.

PORT ALFRED is a seaport town situated on both banks of the Kowie river, and connected by railway† to Grahams town, 36 miles distant; it possesses many advantages as a harbour for coasting and other small vessels. Here are custom and bonding warehouses, and other buildings, with every facility for landing and shipping goods, the railway extending along the quays; also lighters for loading, and discharging at the outer anchorage. Vessels, up to 300 tons burthen, can enter the port, and those of 8 to 9 feet draught can lie alongside the wharves, over a mud bottom.

Population, 1885, about 1,000. During that year, 18 steamers and 9 sailing vessels entered the river, of the aggregate tonnage of 6,000 tons, but since that period the greater portion of the exports from this district, consisting of cereals, hides, horns, and skins, has been transferred to Port Elizabeth and East London. Supplies &c., see p. 130.

LIGHT.—On the western pier, and at an elevation of 40 feet above high water, is a *fixed green* harbour light, visible seaward in clear weather from a distance of about 6 miles.

Beacons.—Eastward of mount Cock house, west bank of river: is a flagstaff painted white, which forms the inner mark for the bar. The outer beacon is S.S.E. $\frac{1}{4}$ E., 176 yards from the flagstaff on a small bushy sand hillock, and is formed with two poles of cross bars (resembling a ladder), above which is a sliding pole with a ball on the top, the whole painted red.

The port office signal staff stands on the west wall at about 350 yards from the outer end.

* See Admiralty plan:—Entrance to Kowie river (port Alfred), No. 1,223; scale $\frac{1}{2}$ in. = 6 inches.

† Railway traffic was suspended (probably temporarily only) in 1888.

The bar of Kowie river commences in about 3 fathoms, at the distance of one cable outside the extremity of the west pier, and the water gradually shoals to a least depth of about 8 feet at low water springs. The bar is sand over rock; the passage across the bar varies considerably in direction, position, and depth. Westerly and south-westerly gales send in a heavy swell, which drives quantities of sand into the river, a deposit which the ebb tide does not immediately remove. In fine weather, however, vessels of 13 to 14 feet draught, with the assistance of a pilot, may cross the bar.

The ROADSTEAD.—Dangers.—A shoal with $2\frac{1}{2}$ fathoms at low water, and $3\frac{1}{2}$ fathoms inside of it, lies with Bushy hillock on Salt Vlei point bearing W. by N. $\frac{1}{2}$ N., distant 8 cables, and the signal staff on the west pier head N. $\frac{1}{2}$ E. 5 cables. Another shoal with $3\frac{3}{4}$ fathoms, and on which the sea breaks in bad weather, lies with the extremity of the west pier head bearing N.W. by N., distant a third of a mile, and is near the line for crossing the bar. These shoals are just without the shallow ground which extends in places nearly half a mile from the shore, on the west side of entrance to the Kowie river.

Fountain rocks cover a space of nearly three-quarters of a mile, east and west, and more than 4 cables north and south. Some of these rocks are awash at high water, others uncover at half tide, and the sea always breaks on the outer patches.

The south-western of these dangers has $1\frac{1}{2}$ feet water, and the sea always breaks. It lies with the signal staff on the west pier bearing N.W. $\frac{7}{8}$ W., distant $1\frac{1}{10}$ miles, and Atherstone point N.N.E. $\frac{1}{2}$ E. 7 cables nearly. The south-eastern patch, $1\frac{1}{2}$ cables eastward of the south-western, has 3 feet water, the sea always breaks, and it lies with the signal staff bearing N.W. by W. westerly, distant $1\frac{1}{4}$ miles. There are depths of $5\frac{1}{2}$ to 8 fathoms close to these patches, and from $1\frac{1}{2}$ to 6 fathoms between the rocks in general.

Jansens rock lies E.S.E. southerly $3\frac{1}{2}$ cables from the east dry rock of the Fountain group, and is awash at low water, with 5 fathoms close eastward and 9 fathoms southward of it.

Clearing marks.—The quarries on the east bank of Kowie river, bearing N.N.W. $\frac{1}{2}$ W., and kept open west of the ridge rising to the old custom house leads westward of Fountain rocks; and the gap in the cliffs near the outlet of Rufane river, bearing N.N.E. $\frac{1}{2}$ E., leads eastward of the rocks.

There is a channel of $3\frac{1}{2}$ fathoms water between Fountian rocks and the shallow water extending from the shore, the leading mark for which is the Sand patch just open south of Bushy sand hillock on Salt Vlei point, bearing West. The sand patch is difficult to make out, and therefore vessels should not use this passage.

Directions.—Vessels approaching Kowie river from the westward may identify its position by the beacon on Glendower peak, and by the conspicuous sand hill under it, at $3\frac{1}{2}$ miles westward of the river; the adjacent country consists of smooth grassy slopes dotted with bush and fronted with a line of sand hillocks. From the eastward, Black rocks or Three Sisters, 7 miles eastward of the river, will, with the houses and flagstaffs at port Alfred, serve to identify the land-fall. *See* page 132. Having arrived off the river, distant about 2 miles, the anchorage may be steered for on the line of leading beacons for crossing the bar, viz.: Mount Cocks flagstaff in line with red beacon, bearing N.N.W. $\frac{1}{4}$ W., and anchoring in about 15 fathoms as hereafter recommended, observing the clearing marks for keeping westward of Fountain rocks.

Vessels that can cross the bar, will, by signalling to the port office, obtain all information about the state of the bar, and as soon as it is possible, a pilot will be sent out, but a stranger should not attempt to cross the bar without one. *See* signals, page 130.

Anchorage.—The outer anchorage for large vessels, off Kowie river is in from 15 to 17 fathoms, sandy bottom, with port office signal staff from N.N.W. to N.N.W. $\frac{1}{2}$ W., westward of this the bottom is rocky. The inner anchorage, in 9 fathoms, lies half mile northward of it, but the sea breaks here in bad weather.

The bottom is rocky, interspersed with patches of sand, and the holding ground is not good. Large vessels should veer to 80 or 100 fathoms of cable, then they will ride easily. The cables should be ready for slipping, and vessels prepared to put to sea, at the commencement of a gale (the indications of which are pointed out by signal at the port office), and more especially at the commencement of black south-easters. The gales seldom blow directly on shore.

In case of putting to sea, masters of vessels should bear in mind that the Agulhas current sets to the westward frequently at the rate of 80 to 90 miles per day, and that moderate shelter may be found under the Bird islands in Algoa bay.

Supplies.—Provisions are plentiful, but water is scarce and of indifferent quality. Ballast is obtainable in the river, free of charge, but a fixed charge is made for conveying it to the roadstead. A

small quantity of coal is kept for railway purposes; the railway company have also a fitting shop, where repairs to engines of about 50 horse power have been made.* There is a government slip capable of taking a vessel of 150 tons burthen, or of $7\frac{1}{2}$ feet draught, and the derrick on the wharf is capable of lifting $7\frac{1}{2}$ tons. There is also a good lifeboat here.

The Albany hospital at Grahams town receives patients.

Communication.—Port Alfred is in telegraphic and railway communication with the towns of the colony. The Union, Castle, and other lines of steamers call here. *See page 8.*

Pilots for the river are always in readiness with the tug; there is no charge for pilotage, but a fixed tariff for the use of the tug.

Time Signal.—A time ball is dropped from the signal staff, near the inner end of the west pier, by electricity from the Cape Observatory, at 1h. 0m. 0s., Cape mean time, equivalent to 23h. 46m. 05·3s. Greenwich mean time. Latitude of signal staff, $33^{\circ} 36' 9''$ S.

Signals.—The International code of signals is used at the port office, with which communications can be kept up. Weather reports are posted up daily.

Port office signals.—A number (indicated by one flag) is given to every vessel upon arrival.

Black ball over union jack - Veer to a whole cable, and see second anchor clear.

Black ball under union jack - Put to sea at once, get an offing.

Union jack at masthead - Send down top-gallant yards and masts, point yards to the wind, and see all clear for working ship.

Black ball over the ensign - Bar cannot be crossed.

A blue flag will be shown at the west yard-arm of the flagstaff on the flood tide, and a red flag on the ebb.

At night.—A rocket fired across the river - Bar cannot be crossed.

Vessels not having the International code of signals can make the following signals with their ensigns, namely :—

1. Ensign in fore topmast rigging - In want of a cable.
2. Ensign in main topmast rigging - In want of an anchor.
3. Ensign in fore rigging - - Parted a bower cable.
4. Ensign in main rigging - - In want of anchor and cable.
5. Wheft where best seen - - Want assistance or a tug.

* See second foot note, page 127.

Tides.—It is high water full and change at Kowie river at 3 h. 50 m.; springs rise $5\frac{1}{2}$ feet, neaps rise 3 feet. The tides are influenced by the winds, varying from 6 inches to a foot; they fall with easterly winds and rise with westerly winds, and at high water, in southerly gales, a heavy swell and undertow are experienced up the river. The influence of the tide reaches 12 miles up the river.

Current.—No regular ebb and flow of tide is felt in the roadstead, but a current often sets against the wind, and assists vessels in riding out strong gales. Vessels cant a point or two according to the strength of the wind, but scarcely ever lie broadside to the wind.

With westerly winds and fine weather the current, at about 2 or 3 miles off shore, sets invariably to the eastward; after a day or two of strong easterly winds it runs to the westward, but only for a short time.

Winds.—The prevailing winds in the summer months are from East to S.E., and in the winter months from West to S.W.; sailing vessels can enter the river with the winds from W.S.W. round by south to E.N.E., but the wind is seldom to the northward of East except during the summer months in the morning until 8 or 9 o'clock, when it comes in from the S.E. for the day, and is a smooth-water wind.

COAST.—From Kowie river the sandy beach extends eastward rather more than one mile to Atherstone point, thence 5 miles to Riet point. This coast is low, sandy, and in places fringed with rocks. The hills at half a mile inland rise to a height of from 230 to 350 feet. Rufane river lies one mile eastward of Atherstone point, but its mouth is closed up. The hills between which the Rufane river runs are a quarter of a mile from the beach, the eastern being the higher rises to a height of 265 feet, covered with bush, and sand extends some way up its sea-face. Half a mile westward of Riet point are some outlying rocks, at 2 cables distance. The shore here is backed by hills from 345 to 380 feet high, and faced with sand in places; their summits are covered with bush; at one mile westward of Riet point, immediately behind the coast ridge, is a hill, 486 feet high, and when seen from east or west is conspicuous.*

Riet (Reed) Point reef.—Riet point is low and sandy, and sunken rocks extend 4 cables from it. The sea breaks a considerable distance off the point, and vessels should give it a wide berth in passing; Glendower peak beacon, bearing W. by N. $\frac{2}{3}$ N., leads nearly one mile seaward of the rocks; † at $1\frac{1}{2}$ miles eastward of the point are the Black rocks (Three Sisters); near the middle of the bight between, Riet river drains out.

* See Admiralty chart:—Cape St. Francis to Waterloo bay, No. 2985.

† See View on chart, No. 2,085.

Black rocks or Three Sisters are connected with the shore by a narrow neck of land; they show conspicuously against the white sand behind, and appear like an island. The central one is 50 feet high, and on their sea side they are nearly perpendicular.

Eastward of the Black rocks are several outlying sunken rocks, the outer one lying S.E. by E. $\frac{1}{2}$ E., distant 4 cables from the highest Black rock, and 2 cables off shore.

At 6 cables beyond the black rocks is a low sandy point, with outlying rocks, extending 3 cables in a S. by E. direction, beyond which the sea breaks for a considerable distance. The hills at the back of this coast gradually rise, and at a distance of 2 miles are about 300 feet in height, and cultivated.

The Kleinemond rivers lie about one mile eastward of Black rocks. The sandy mouths of these two rivers, which are generally closed, are separated by a narrow strip of land, and at a short distance off appear as one river with two arms; they traverse a low country, covered with grass and patches of bush. The hill on the east side of the river is 177 feet high, and in front of it is a small patch of rocks extending from the beach, and about midway between it and Fish point are two other small patches; with these exceptions the beach is sandy.

The coast from Kleinemond rivers trends $3\frac{1}{2}$ miles eastward to Great Fish point. The hills near the sea are bushy, faced with sand nearly to their summits, and, at $1\frac{1}{2}$ miles eastward of Kleinemond rivers, attain a height of 350 feet. Three-quarters of a mile further eastward is the highest part of the ridge (390 feet), and on the east side of it the sand is bare on the top, which is conspicuous from seaward.

GREAT FISH POINT is low, sandy, and fringed with rocks, with a sand hillock near its extremity. A rock which shows at low water, with a depth of 12 fathoms at 3 cables outside it, lies with the sand hillock bearing N.N.E. nearly half a mile. The coast hills rise in a short distance to a height of 260 feet.

From Great Fish point the shore trends eastward $1\frac{1}{2}$ miles to Little Fish point near the entrance to Great Fish river. At three-quarters of a mile eastward of Great Fish point, and about a quarter of a mile off shore, is a half-tide rock, outside of which and off the rocky points the sea breaks. Little Fish point, situated about half a mile westward of the entrance to Great Fish river, is rocky, and dries out for some distance at low water; the hill over it is 140 feet above the sea, covered with bush and partially faced with sand.

GREAT FISH RIVER.—The mouth of Great Fish river is always open, but the depth in the entrance is not stated; probably

it is not known, as entering it must be at all times attended with considerable danger, on account of the breakers across the entrance.*

At Rocky head, the north-east point of entrance, are three dark rocks, 25 feet high, extending in a S.S.W. direction; outside and around which are several other rocks, showing at low water, and extending to the distance of 1½ cables in places. The sea breaks for some distance outside these rocks.

At 3 cables within the north-east point is a dark bushy peak 100 feet high, rising steeply from the river, and near the base of it is the narrowest part of the entrance, which is about 20 yards wide, and here the water appears deep for a breadth of about 10 yards, where the sea does not break successively, having at times an interval of five minutes, when a boat could effect a landing; but when the sea does break it is with treble the violence of the constant rolling surf along the sand before the river's mouth. At particular seasons the river rises considerably, when the current becomes too strong for craft to enter; at other times the river is a mere stream, and the current then is inconsiderable.

The position of Great Fish river may be made out in clear weather by some distant hills of an undulating form, which bear N.N.W. when on with the ravine through which the river flows. The river makes apparently a very perceptible gap in the coast line if near the land.

Current.—The water of Great Fish river is of a red colour, and may be traced after rain for some miles westward of Kowie point, but is seldom seen to the eastward of the river; from this fact it is evident that an easterly current near this part of the coast, though occasionally experienced, is not a constant or frequent current.

Waterloo bay.—From the east point of Great Fish river the shore curves slightly to the western part of Stalwart point, which bears East distant about 4 miles from Rocky head. There are two streams between, which are closed with sand. The western part of this curve is named Waterloo bay. All vestiges of the establishment that existed here in 1846 and 1847 have disappeared. The coast hills rise steeply from the beach to a height of from 180 to 250 feet faced with sand nearly to their summits, which are covered with dark bush; the highest part of the ridge is about 2 miles eastward of the river.†

* See plan of Waterloo bay, No. 1,926; and view on chart, No. 2,085.

† See plan of Waterloo bay, No. 1,926; scale, $m = 4\cdot0$ inches; also charts, Nos. 2,085 and 2,086.

Immediately eastward of Rocky head and inshore of the eastern low-water rocks is a small sandy beach, followed for about three-quarters of a mile with a beach fringed with rocks, when it becomes for about half a mile clear ; about $1\frac{1}{4}$ miles from the mouth of Great Fish river a ledge of rocks extends eastward two-thirds of a mile, and projects from the beach a distance of nearly 2 cables ; at one cable off the eastern extremity of the ledge is a small sunken rock ; thence to the western part of Stalwart point the beach is sandy and free from rocks.

Anchorage.—Vessels should not anchor in a less depth than 9 fathoms, with Great Fish point bearing W. $\frac{1}{4}$ S., and the south-west end of the rocks about half a mile eastward of Rocky head landing place, about N. by W. $\frac{1}{2}$ W. This is, however, an exposed rocky anchorage, and the rollers which occasionally set in during calm and foggy weather render it unsafe.

Vessels should always be ready to slip and put to sea, in the event of a S.E. wind or rollers setting in, and should not remain longer at the anchorage than absolutely necessary.

Large vessels should avoid this anchorage, but, if obliged to call here, they may anchor in 14 fathoms at a considerable distance from shore, in which depth the bottom is clean and good holding ground, coarse sand ; but this is too inconvenient a distance for landing.

The Landing was formerly effected in the bay between the rocks of Rocky head and those to the north-east of them, in surf boats, and with them it was difficult. A great strain was brought on the surf lines by the strong current setting along the shore.

Tides.—It is high water, full and change, at Waterloo bay, at 4h. 0m. ; springs rise about 6 feet.

STALWART POINT.—From the west part of Stalwart point, the shore eastward is fringed with an almost continuous series of ledges extending in a southerly direction a quarter of a mile from the beach, off which at a short distance are several sunken rocks. The sea breaks in bad weather a distance of three-quarters of a mile from the shore.

Stalwart point is broad and rounding, the beach narrow, and the coast ridge near its west end 224 feet high, but is much lower towards its eastern part. The hills are of sand some distance up their sea face. From this ridge the grassy land at the back rises in a short distance to a height of 377 feet and slopes on both sides of the point ; on its western slope are two or three farm houses visible from seaward.

Impekquina river, an insignificant stream, at 2 miles eastward of Stalwart point, is generally closed ; half a mile westward of the river the before-mentioned rocky ledges cease, and the beach is free from rocks until just beyond the river. A little west of the river is a dark bushy head 144 feet high partially faced with sand, and at the back of which, a quarter of a mile inland, is a white house visible from seaward.

Umtata river.—From Impekquina river the shore trends 1½ miles eastward to Umtata river, which is generally open. The intervening shore is fringed with rocky ledges extending some distance from the beach, and the sea breaks a long way outside of them.

The hill on the west side of Umtata river is 260 feet high, and is a third of a mile from the outer part of the beach ; the hill on the east side, is 149 feet high, covered with dark bush, and faced with sand a short distance up. Off this hill a ledge of rocks extends from the beach ; outside the ledge there are some sunken rocks which bear S.S.E. from the highest part of the hill, and distant a quarter of a mile from the shore.

From Umtata river to Golana river (which is closed), a distance of one mile, the beach for about half way is fringed with rocks. A rocky point extends from the east side of the river, outside of which is a detached rock 2 cables from the shore.

Bequa river is generally closed, and is 3 miles eastward of Golana river. The beach between is fringed with rocky ledges, extending in a southerly direction, nearly two cables from the shore, with several sunken rocks beyond. The coast ridge rises steeply from the beach, and gradually increases in height as Bequa river is approached ; sand extends up the sea face nearly to the summit, which are covered with dark bush, except the highest point of the ridge, which is bare sand, 308 feet high, and three quarters of a mile westward of Bequa river ; this is the last bare sand hill for many miles. About half a mile west of this sand hill a patch of bushes extend from the top of the ridge nearly to its base, and renders this piece of coast remarkable and easy of recognition.

Madagascar reef, about 7 cables in length, covered at high water, and with a depth of 12 fathoms at 2 cables distance, lies half a mile from the shore, with the west extreme of the hill on the east side of Bequa river N.W. ½ N., and the east extreme of the hill on the west side of entrance of Gosha river N.E. by E. The sea always breaks over the reef.

Gosha river.—From Bequa river to Gosha river about 2 miles eastward, the shore is a broad sandy beach, and midway fringed with

rocks at low water. As Gosha river is approached, the coast ridge rises to a height of 270 feet, the sand reaching near to its summit.

Coast.—At 3 miles eastward of Gosha river is a point, on the east side of which a small stream discharges; at a distance of a quarter of a mile, and one mile respectively from Gosha river, two small streams empty themselves.

Eastward to Keiskamma point the beach is sandy and fringed at low water with rocks. The coast ridge is partially faced with sand to a height of 40 to 70 feet, except in one spot about 2 miles west of the point, where the sand rises obliquely to the summit of the ridge, and attains a height of about 220 feet. Immediately behind the land rises to a height of 300 feet, is covered with grass, and about half a mile westward of the point forms a remarkable green head, on the summit of which is a large white house visible from all directions.

At one mile westward from Keiskamma point, and 3 cables from the shore, is a rock which shows at low-water springs. Outside the rock the sea breaks heavily in bad weather.

Between Keiskamma point and Buffalo river, which are about 27 miles apart, the land appears high, covered with grass and bush in patches, and is intersected with several streams and deep ravines. The shore is backed with an irregular ridge of coast hills, which are covered with dark bush, and at intervals faced with sand.

Aspect.—The high head near the coast, west of Keiskamma point, with a white house on its summit, together with the bushy hillock on the point, and a round topped grassy hill 3 miles N.N.W. inland of it, (which is visible from all directions, and from seaward a clump of bush is seen on its southern slope,) as well as the Keiskamma river presenting a wide opening, renders this part easy of recognition from the southward.

In this vicinity, at a distance of 5 or 6 miles inland, the land rises to a height of from 600 to 700 feet, and when well off the coast a range of mountains 2,000 to 3,000 feet in height, which are in the vicinity of King Williams town, may be seen. The range in the vicinity of Grahams town is also visible.

KEISKAMMA POINT is low, sandy, and fringed with rocks; near its extremity is an isolated, bushy-topped sand hill, 110 feet high, which when seen from the westward and from a position near the coast appears like an islet.

Caution.—Between Keiskamma and Bashee points, vessels should not approach the shore nearer than one mile, or at night and in thick weather under 40 fathoms. The edge of the bank of soundings is always well defined, the sea being smoother on than off the bank. The distance of the 100 fathoms line of soundings from the coast is 10 to 13 miles, beyond which depth it deepens to 200 or 300 fathoms within the distance of one mile.

Keiskamma river lies about one mile north-eastward of Keiskamma point, and the beach between is sandy. At half a mile from the low and sandy south-west point of entrance is a hill 205 feet high, covered with bush. The north-east point of entrance is also low, but rocky; extending from a hill 152 feet high, covered with dark bush, and close to its base is the channel of the river, which is about half a cable wide at low water, and apparently deep. Inside, the river opens into a basin about one mile in extent, partially dry at low water; the main stream trends northward from the basin, and many miles into the interior, draining a large tract of country.

On the west bank of the river are the two German villages of Hamburg and Bodiam; the former is about one mile, and the latter 5 miles from the entrance. Boats have been known in fine weather to leave and enter the river in safety, but such an occurrence is not frequent, and it is always attended with danger, as no dependence can be placed on the bar, the depths on which alter after every gale or heavy rain. The surf breaks heavily off the river, and in bad weather extends a long half mile from the shore. A quarter of a mile eastward of the entrance, and about one cable off-shore, are some rocks which appear at low water.

A 10-fathom patch, with 15 fathoms inshore of it, lies with the mouth of the Keiskamma bearing N.N.W. $\frac{1}{4}$ W. distant $1\frac{1}{2}$ miles.

The coast about the Keiskamma is about 500 or 600 feet above the sea, with patches of white sand 80 or 100 feet high, conspicuous against the dark land. Keiskamma river may be identified by a mountain of a conical shape, flattened at the top, standing by itself, and a short distance to the eastward another high mountain which has three distinct elevations and falls; when these mountains bear N N.W. they are in a line with the entrance of the Keiskamma.

The Coast from Keiskamma river trends eastward about 6 miles to Chalumna river; there are several streams between, two of which, like most of the small streams on this coast, are choked with sand; the eastern stream (Guanie) is open at high water.

The shore to Guanie river is sandy and fringed with rocks at low water, with the hills rising suddenly from the beach to a height of

from 150 to 270 feet, faced with sand some way up, above which they are covered with dark bush.

About a quarter of a mile west, and a third of a mile east of Guanie river, are two remarkable bushy-topped sand peaks, the eastern one more particularly so, as the hill at the back of it, which rises steeply to a height of 430 feet, is covered with grass, against which the dark appearance of the peak forms a striking contrast. The hill at the back has two lumps on it, which, with the fact of its being the highest head near the coast for many miles, is also conspicuous.

Chalumna river is about 7 miles eastward of Keiskamma point ; a sand bank extends across its mouth at low water. Rocks extend about $1\frac{1}{4}$ cables off shore, from a half to one mile eastward of the river.

The COAST from Chalumna river is rocky, and trends eastward $1\frac{1}{2}$ miles to a rocky point ; at three quarters of a mile beyond the point is a small stream, on the west point of which is a bushy sand peak ; at one mile farther on is another point, between which the coast is comparatively low, and covered with bush and grass. At the back of the bight to the eastward is a black bushy hill, on the west side of a small stream ; the sand extends up its south-east face to a height of about 70 feet.

Thence the beach is sandy, and fringed with rocks for about $1\frac{1}{4}$ miles to a small point, on which is a small grassy ridge 20 feet high ; at $3\frac{1}{2}$ cables S.W. by S. from it is a dangerous breaker. At two-thirds of a mile farther on is the entrance to Nieca river.

Nieca river is open at high water, but a spit of sand extends nearly across from the west side at low water. The east point of the river rises to about 150 feet, and is covered with bush.

About one mile beyond the Nieca is another small river, eastward of which the shore becomes low, with a few grassy hillocks near the beach.

Another small river empties itself into the sea northward of a low point, $2\frac{1}{2}$ miles eastward of Nieca river. At the north-east point of entrance is a black bushy peak 185 feet high, and the coast west of it being low renders it conspicuous.

Near the beach, there are three black hummocks with white sandy bases ; behind the westernmost of these and in a hollow on the first line of hills there is a large isolated tree which is conspicuous at 4 or 5 miles distance : about a mile west of this tree there is a remarkable sand cliff. Excepting these marks there is a sameness in this part of the coast, sand-hills topped with brush being the prominent feature.

Nkutu river lies nearly 5 miles eastward of the Nieca river, and is generally open at high water. South-eastward of the river and at one cable from the shore are some outlying rocks; and a sunken rock lies S.E. distant one-third of a mile. At one mile inland is a long bushy hill, 414 feet high, and near its eastern part half way down the face of it, is a white house which may be seen from seaward.

Gola river.—At $2\frac{1}{2}$ miles eastward of Nkutu river is the entrance of Gola river, which is open at high water; the shore between is fringed with rocks, and the coast hills are covered with bush faced with sand, but they are not high. The hill at the west point of Gola river is about 120 feet high covered with bush, the sand extending up its face some distance, and a streak of sand runs up its south-west side to the summit, which may be seen several miles to the westward.

At about one-third of a mile south-eastward of the entrance is Gola point, from which the land rises precipitously 336 feet to a rounded top covered with grass; and inland two-thirds of a mile is a remarkable peak topped hill 443 feet high, also covered with grass, which is conspicuous from all directions. At $1\frac{3}{4}$ miles eastward of Gola point is a small stream, off which is a sunken rock, bearing S.W. $\frac{1}{2}$ S. one-third of a mile.

Cove rock, situated $2\frac{1}{2}$ miles eastward of Gola point, is a blackish quoin-shaped rock, 86 feet high, about a quarter of a mile long, with a deep notch in the middle, and sloping to the westward. It is connected with the shore, from which it is about 3 cables distant, by a long broad neck of sand, and hence appears as an island, and a good mark when navigating along shore. On its west side are some outlying rocks; the outer or western, bears West from the highest part of Cove rock, distant half a mile, and generally breaks; also S.W. by S. from the highest part of Cove rock and distant nearly 2 cables is a small rock, visible at low water springs.

Landing.—Eastward of Cove rock on a small sandy beach immediately to the northward of the rock, boats may land even in S.E. winds.

The Coast from Cove rock eastward assumes a more pleasant aspect; bare sand hills are now only occasionally met with, and they always have such remarkable forms as to make good landmarks.

From the small stream eastward of Cove rock, the shore trends eastward to Hood point, with several small streams between, and is

fringed with rocks, but there are no off-lying dangers. The coast hills are much lower for $1\frac{1}{2}$ miles, where there is a high bushy topped hill between the mouths of two small streams, the hills then become low again, and in places the grassy slope reaches down to the beach.

Hood point is low and rocky, but rises steeply from the beach to the top of a ridge 107 feet high, covered with grass and scattered bush ; the bight on its west side appears shoal. From Hood point the shore trends eastward for $1\frac{1}{2}$ miles to Castle point, the south-west point of Buffalo river ; between these points the grassy slope comes close down to a stony beach.

BUFFALO RIVER.—EAST LONDON.—The town of East London stands on the south side of Buffalo river, at about 60 feet above the sea ; and with its flagstaffs, churches, lighthouse, and the bluff 150 feet high, on the north bank of the river, may easily be recognised from the offing.* It is about 700 miles east of Cape Town, 150 miles by sea from port Elizabeth, and is the terminus of the line of railway from Queen's Town, a distance of about 180 miles. The population is about 2,000.

The town of Panmure is situated on the north shore, half a mile above East London ; its importance is probably much increased by the extensive wharfage, &c. constructed near it.

The Buffalo river is navigable for boats for about 3 miles ; its banks are steep, and attain a height in places of 200 feet.

The port is generally considered the natural outlet for the trade of the border divisions, and of the states and territories beyond the Orange river. In common with all the rivers on this coast, the Buffalo is obstructed by a dangerous sand bar, but by the construction of training walls to confine the river and the use of dredgers, rapid progress has been made in deepening it, and it is expected shortly, there will be sufficient water on the bar for ocean-going vessels, but the depth will always be subject to great variation from gales of wind. As an instance of the improvement effected, it may be stated that in 1887, only vessels of less than 11 feet draught could cross the bar, whereas in November 1888, a vessel of 15 feet draught entered.†

* See Admiralty chart :—Buffalo river, with views, No. 1,843 ; scale $m=5\cdot9$ inches.

† Information on training walls and breakwater, from Sir John Coode, December 1888.—London Shipping Gazette, 22 December, 1888.

The wharves are fitted with steam appliances for loading and discharging vessels that can enter the river, and the railway runs along the wharves.

The wharves below Panmure, on north side of river, have, apparently, depths of 11 to 18 feet near them.

Castle point is the south point of entrance to the Buffalo river ; it is low and rocky, with outlying rocks extending a distance of nearly 2 cables ; these rocks probably tend to break the force of the sea on the breakwater which has been built out from the point some 500 yards seaward of the lighthouse.

The coast for about three quarters of a mile to the northward of the river is fringed by a ledge of rocks, with detached low-water rocks extending in places to the distance of one cable. At about a quarter of a mile northward of the point is the quarry where stone is obtained for the harbour works.

Rocky bank.—At $5\frac{1}{2}$ cables S. $\frac{1}{2}$ W. from the lighthouse, and about 4 cables off shore, is the east extreme of a rocky bank, which extends about $2\frac{1}{2}$ cables in a W.S.W. direction, with a depth of $4\frac{1}{2}$ fathoms. The sea breaks heavily over this bank in bad weather.

LIGHT.—From a lighthouse, painted in alternate red and white bands, erected on the reef near the inner end of the breakwater at Castle point, is exhibited, at an elevation of 45 feet above the sea, a *fixed* white light, visible in clear weather from a distance of twelve miles. Position, lat. $33^{\circ} 1' 45''$ S., long. $27^{\circ} 55' 2''$ E.

Anchorage.—There is good anchorage, with westerly winds, in 11 or 12 fathoms, with Cove rock in line with Hood point bearing W. $\frac{1}{4}$ S., Castle point lighthouse W.N.W., and Kahoon point N.E. by E. $\frac{1}{2}$ E. In the summer or south-east season, vessels should anchor farther off shore, so as in case of parting to have room to clear the dangers off Castle point. Vessels whose draught permits, will take the earliest opportunity of entering the river.

The holding ground in the roadstead, consisting of stiff mud under a thin surface of sand, is good, and said to be free from rocks. When ships have gone adrift, it has been from parting, and not from dragging. Lost anchors are rarely recovered, owing to the shifting nature of the bottom in gales. The anchorage, however, is much exposed, and vessels generally lie broadside to the sea, and consequently

roll and strain a great deal. Vessels proposing to risk lying here in bad weather, should on no account be in less than 10 fathoms.* The worst wind here is what is called a black south-easter. See Winds, p. 144.

The bar of Buffalo river commences in about 5 fathoms, a short distance seaward of the breakwater and training walls, and decreases gradually in depth to about 10 feet at low water springs, in the entrance between the breakwater and north wall; this depth will probably soon be increased by the dredging operations in progress. As before mentioned, a vessel of 15 feet draught entered the river in November, 1888.

The depths alter considerably with the weather, being decreased generally by a succession of S.E. winds, and increased by westerly winds. West and S.W. winds cause the heaviest sea on the bar; and after heavy gales from those quarters, communication is at times impracticable. As the rollers set across the channel, the bar is dangerous even to surf boats.

The average number of working days in the road, exclusive of Sundays and holidays, is 22 per month, and it is exceptional for communication with the shipping, by means of the steam tugs employed for that purpose, to be stopped.

Landing.—Boats should never attempt to cross the bar, even in the finest weather, unless accompanied by some one having local knowledge.

Landing is generally made by means of large decked surf boats of about 30 tons burthen, which haul backwards and forwards by a hawser running in rollers at the bow and stern; the inner end of the hawser is secured within the breakwater, the outer to an anchor outside the bar in 6 fathoms, from which a branch warp is laid north-eastward, with its outer end in 7 fathoms, from whence they are hauled alongside the shipping for loading or discharging.

Signals for the surf boats.—A red flag, with a white square in the centre, hoisted at the port office flagstaff (nearest the lighthouse) signifies that the bar is passable.

The flag at half-mast denotes that the bar is dangerous.

* See remarks on winds and weather, page 144. In 1861, the *Elizabeth Mary*, of about 300 tons, and the *Shrimp*, of 45 tons, went down at their anchors with all hands, in consequence of lying in too shoal water.

When no flag is shown the bar is impassable.

Communication can be made with the port office by means of the Commercial code of signals.

Supplies.—Water is supplied to the shipping from the municipal works; fresh provisions are cheap and plentiful. There are several tugs at the port, one of which is always in the roadstead. There are two lighter companies, possessing 22 or more lighters, some of which are of 75 tons. The dispatch afforded to steamers is such, that their cargo is taken as rapidly as they can put it out. Sailing vessels fitted with appliances for discharging, meet with the same facilities.

Repairs.—Large repairs to machinery and boilers are undertaken by the engineering firms; shafts of 23 inches can be turned, cylinders of 40 inches diameter cast, and castings of $1\frac{1}{2}$ tons made. There is a steam-hammer of 20 cwt., and 2 cranes each capable of lifting 10 tons, besides smaller ones.

Coal.—About 5,000 tons of coal are usually in stock. Coaling is done by surf lighters, brought alongside by tugs; from 200 to 400 tons can be put on board daily if due notice be given. Coaling in the road is often interrupted by bad weather.

Time Signal.—A ball is dropped by electricity from the cape of Good Hope observatory at 1h. 0m. 0sec. P.M., Cape mean time, equivalent to 23h. 46m. 5·3sec. Greenwich mean time.

Communication, Telegraph.—See page 8.

Tides.—It is high water, full and change, at the mouth of Buffalo river at 3h. 47m.; springs rise 5ft., neaps, $3\frac{3}{4}$ ft.

Currents.—At the anchorage off East London, the current generally runs to the westward at a rate of one to $2\frac{1}{2}$ knots an hour. In calm weather it occasionally runs to the eastward at the rate of half a knot, and sometimes stronger.

In shore near the edge of the breakers an eddy current frequently runs to the eastward; this current is variable in its strength, but seldom attains half a knot an hour.

In the offing at about 15 miles from the coast, the regular Agulhas current runs south-westward from 2 to 4 miles an hour.

Directions.—Trading vessels bound to East London from the westward, generally call at Algoa bay ; when practicable they should leave that port so as to make East London during daylight. The remarkable sand streak on the hill at the west point of Gola river, and Cove rock appearing like an island with the sand hill immediately inshore of it, will indicate the approach of the vessel to East London, and on reaching Hood point, which should not be approached nearer than one mile, the lighthouse on Castle point and the town of East London will be visible. Vessels should keep at the distance of one mile off-shore, and in not less than 20 fathoms water, until the lighthouse bears westward of North, then steer for the anchorage before described.

Except with a fair wind, sailing vessels should make for a position to the north-eastward of Buffalo river, bearing in mind that the current nearly always sets about W. by S. A remarkable sand hill, Sand Kop Trig, 281 feet high, covered with bush, and partially faced with sand, with a sandy streak stretching up its west side to the summit, lies 2 miles north-eastward of Castle point lighthouse, and can be seen at a distance of several miles.*

Winds and Weather.—The weather off East London presents a marked difference to that of any other part of the coast. When the mercury commences to rise on the wind shifting to the westward, the crisis is accompanied by lightning, thunder, and heavy rain. If the wind shift suddenly in a squall to the south-west, the barometric pressure increases rapidly, a fresh gale may be expected, with fine weather, which will continue until the mercury attains about 30·4 inches. If the barometer remains low and steady, a strong gale may be expected from W.N.W., which will probably continue for several days ; but if the wind shifts slowly to S.W., the barometer rises slowly, and a drizzling rain sets in, a fierce gale and mountainous sea may be looked for. These much-dreaded south-west gales occur often after unsettled weather in June, July, and August, preceded by a moderate to fresh easterly breeze, and a gradually diminishing pressure.

The wind begins to blow hard from west, and shifts slowly until the mercury is about 30·0 inches ; the sky becomes leaden-looking, and a thick drizzling rain sets in ; the barometer oscillates between 30·00 and 30·10 inches, and the thermometer is considerably below the average. These gales blow with much violence, and have been the cause of much disasters to shipping at different times in East London roads.

* See view on plan of Buffalo river ; and aspect of coast, p. 145.

During the summer, October to April, easterly winds prevail, and S.E. gales may be expected. *See Algoa bay, winds, &c., p. 113.*

Sailing vessels (unless they prefer the risk of riding it out) would do well to put to sea when a south-west gale is approaching, standing to the eastward and heaving-to; they would have no difficulty in regaining the anchorage without loss of time, as soon as the gale had subsided. During S.E. gales it is also advisable for them to put to sea in time, notwithstanding the delay which may possibly take place in regaining the port after the gale has subsided.

Rollers seldom set in during the summer months, but they are frequent during the winter, the barometer generally standing two or three tenths above 30.0. The rollers along the shore, generally break out to a depth of 3 fathoms, and in stormy weather to a depth of 5 fathoms. In very heavy gales it is stated that they break out to a depth of 7 or 8 fathoms, and on other parts of the coast they break occasionally in 10 fathoms.

The COAST between East London and Bashee river is everywhere fringed with rocks and a heavy surf; few places offer any chance of successful landing even in the most favourable weather. At Gonubie point, on the south-west side of the bight, landing might apparently be effected.

Aspect.—The most remarkable features on this part of the coast, and by which it may be recognised either in shore or the offing, are, Cove rock, westward of East London; the remarkable peak eastward of Gonubie river; cape Morgan from the south-west and westward by the high perpendicular cliffs (which show very plainly between Ikuko and Sklagha rivers), and from the eastward by the Kei Kop hill and Snag rocks; Sandy point by the sand hills; Mazeppa bay by the remarkable sand hill; and the coast near the Bashee river by the Udwessa cliffs.

Fish may be obtained along the coast, but only on rocky ground.

Inkyanza river.—The coast from the quarry at the north-east point of Buffalo river, continues rocky to the small stream at the west part of a sandy bight, the grassy slope running down nearly to the beach, thence to Inkyanza river is a flat sandy beach; the mouth of the river is closed with sand, and off it are several detached rocks, and some outlying breakers about 2 cables from the beach.

Between Inkyanza river and Kahoon point the coast is formed of rugged cliffs 20 to 50 feet high, against which the sea breaks violently; about 4 cables westward of Kahoon point and half a cable off shore,

is a water-worn rock 15 feet high, with a patch of rocks awash at high water at one cable eastward of it.

Kahoон point is a peculiar shaped bare cliff 35 feet high, with a peak a little behind it 115 feet high ; from the foot of the cliff boulders extend in a south-east direction for about a cable to low-water mark. About 65 yards seaward of the cliff is a black rock 10 feet high. The breakers in ordinary weather extend 3 cables off, and the point should always be given a wide berth.

Landing.—From Kahoон point the coast trends northward for about half a mile, forming a small sandy bight, where it is said landing might be effected, in case of emergency, in westerly gales.

Clearing mark.—The north corner of the barracks on the top of the hill at East London, open of the low part of the bluff over the east point of Buffalo river, bearing West, leads clear of the dangers off Kahoон point.

Kahoон river, lying about two-thirds of a mile north-eastward of Kahoон point, is generally open at high water, the tide running up about 3 miles. The west point of the river is formed by a black bushy peak 80 feet high, and partially faced with sand.

DANGER POINT, 2 miles eastward of Kahoон river, is low, sandy, and fringed with rocks ; between them is a small stream named Gonega river : the highest part of the coast hills, 210 feet above the sea, is behind Danger point, and the sand extends up to its summit.

A dangerous reef, which dries one foot, with 11 fathoms at 2 cables distant, lies 4 cables S.W. by S. from Danger point.*

Between Danger point and Gonubie point, 3 miles to the eastward, are the Klakla and the Ganindugs streams. At the first stream the coast hills become much lower, ranging from 30 to 40 feet in height and continues so to Gonubie point. The beach between the points is fringed with rocks.

Gonubie point and river.—From Gonubie point a ledge of rocks extends to the westward for about half a mile, at about 2 cables off shore. At one mile west of Gonubie point the breakers extend in bad weather 3 cables from the shore, with very uneven bottom outside them. Gonubie point has a small grassy hummock near its extremity about 50 feet in height ; from this point the shore turns sharply to the northward for half a mile to the mouth of Gonubie river, which is open at high water, the tide running up about 3 miles.

* See Admiralty chart :—Waterloo bay to Bashee river, No. 2086 ; scale, $m=0.3$ of an inch.

From Gonubie river the shore trends eastward for 3 miles to Kwelegha point; the coast hills between are higher and for a short way up their sea side are faced with sand; the beach is fringed with rocks. At 2 miles eastward of Gonubie river is a dark bushy peak, 242 feet high, inclining to the eastward; from its peculiar shape this is one of the most conspicuous objects in the neighbourhood. There is also a remarkable dome-shaped peak about 3 miles eastward of it.

Kwelegha point is low and rocky, and half a mile to the northward of it is the mouth of Kwelegha river, which is only open occasionally; at one mile eastward is Bologha river, also open at times. On the south-west bank of the Bologha is a remarkable bushy hill, 237 feet high, and faced with sand a short way up its sea face; the east point of the river is rocky.

Reef point.—From Bologha river the shore trends north-eastward for $2\frac{1}{2}$ miles to Reef point; the beach is sandy and fringed with rocks. Reef point has two rocky horns, at the back of which is a wide sandy beach, from which the coast hills rise to a height of 313 feet. At a quarter of a mile off the west horn of the point is a ledge of rocks, some of which appear at low water, and the sea breaks fully half a mile from the point.

From Reef point the shore trends northward for $1\frac{1}{4}$ miles to Kintza river, which is closed with sand. Thence it trends eastward for $1\frac{1}{4}$ miles to Klefani river (also closed), a mile beyond which is Kwenugha river. Farther eastward is Naagh river and cape Henderson.

Between Reef point and cape Henderson the shore forms a long deep bight; the coast hills are high and faced with sand some way up; immediately behind, the land rises to a height of 350 to 400 feet, and is covered with grass and patches of bush.

The west point of the Naagh river is a bare sand hill about 130 feet high, and conspicuous, being the last sand hill of note for nearly 25 miles.

Cape Henderson rises directly from the rocky beach to a height of 485 feet, and is covered with grass; the land is lower on both sides of it. The cape has a dark bluff looking appearance from seaward, which probably gave rise to its being called a cape.

From cape Henderson the shore trends eastward about 3 miles to Flat point; at $1\frac{1}{2}$ miles eastward of the cape is a small stream, the west head of which is 410 feet high. At one-third of a mile eastward

of this stream is a point, the hill over which is 250 feet high. Off this point is a sunken rock on which the sea breaks in bad weather, bearing E. by S. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from cape Henderson, and a quarter of a mile off shore. About one mile eastward from the point is the Agaga, another small stream ; here the shore becomes much lower.

Flat point and the land eastward for nearly a mile is low and grassy, not more than 25 feet above the sea, but about half a mile inland a grassy ridge rises abruptly to a height of 356 feet.

At $1\frac{1}{2}$ miles eastward of Flat point are two small streams, the Umtwendwe and Nukwana. Eastward of these the coast is much higher, and trends gradually to Ikuko or Double-mouth river, a third of a mile westward of which the coast is 163 feet high and nearly perpendicular.

Ikuko or Double-Mouth river is generally open, and the tide runs up about $1\frac{1}{2}$ miles at high water. At 6 cables eastward of Ikuko river and one cable off-shore are some rocks.

From Ikuko river the shore trends eastward for nearly 2 miles to Sklagha river ; between the two rivers the coast is irregular, and consists of perpendicular cliffs varying from 140 to 220 feet in height.

At Skagla river the cliffs cease ; thence a small sandy beach extends nearly to cape Morgan, between which and Skagla river are several rocks at a distance of 3 to 4 cables off-shore.

From Skagla river to the west extreme of cape Morgan, the coast hills rise steeply from the sandy beach, and are covered with bush.

CHAPTER V.

CAPE MORGAN TO CAPE CORRIENTES.

(Long. $28^{\circ} 22'$ E. to $35^{\circ} 30'$ E.)

VARIATION IN 1889.

| | | | | | | |
|----------------|---|---|---|---|---|---------------------|
| St. John river | - | - | - | - | - | $28^{\circ} 0' W.$ |
| Natal | - | - | - | - | - | $26^{\circ} 20' W.$ |
| Delagoa bay | - | - | - | - | - | $23^{\circ} 30' W.$ |

CAPE MORGAN is a broad flat low point, rising abruptly to a height of 275 feet, at a quarter of a mile from the shore, and at a distance of half a mile inland to a height of 395 feet. It drops suddenly on its eastern side, and from seaward appears a remarkable flat-topped hill covered with bush.

From the west to the east extreme of cape Morgan, the coast line is rocky and nearly straight; it then turns north-eastward for three-quarters of a mile to Ikwili river, the mouth of which is choked; thence eastward to Kei river, the beach is fringed with rocky ledges extending one cable from high water mark.

Rocks.—The highest, and eastern of the group of rocks between the cape and Sklagha river, is 2 feet above high water, and bears West $3\frac{1}{2}$ cables from the west extreme of cape Morgan; in-shore are several other rocks, most of which show at low water. Seaward of these are two detached breakers 2 cables apart; the western one which generally breaks lies S.W. by W. $\frac{3}{4}$ W. distant $6\frac{1}{2}$ cables from the west extreme of cape Morgan. The eastern one seldom breaks.

Clearing Mark.—The west head of Kei river, open of the east extreme of cape Morgan, leads south-eastward of the rocks.

Anchorage.—There is good shelter from north-west and westerly winds, from a half to three-quarters of a mile eastward of cape

Morgan, and the same distance off shore. Here, under favourable circumstances, landing might be effected.

KEI RIVER lies $1\frac{3}{4}$ miles eastward of cape Morgan. The bar is scarcely ever practicable, but the depth is reported to be 6 or 7 feet at low water. Breakers extend about one mile seaward of the entrance.

On the south-west side of entrance is a dark bushy hill 190 feet high, rising almost directly from the beach ; from the foot of this hill a long spit of sand extends in a north-east direction, to within about 85 yards of the north-east side of the river, between which the stream flows ; the channel is about 25 yards wide at low water.

This channel leads between the sunken rocks extending from the north-east point, and the breakers on the bar, which are 30 or 40 yards to the southward.

Inside its narrow entrance, Kei river opens to a width of one-third of a mile, and near the mouth are two sand banks dry at low water ; the river runs first $1\frac{1}{2}$ miles north-north-west, for which distance the west bank is low ; it then turns north-north-east for $2\frac{1}{2}$ miles, the land on the west bank being about 500 feet high and nearly perpendicular ; the east bank rises gradually for about $1\frac{1}{2}$ miles above the first bend, and then becomes perpendicular and about 500 feet in height ; the stream then turns to the north-west and west for 2 miles, and narrows to about 250 yards.

In this upper bend the left bank rises nearly perpendicular to a height of 825 feet, and its right bank to a height of 865 feet, terminating in a round-topped hill named the Kei Kop, which may be seen from most directions, being the highest hill in the neighbourhood. The river then runs southerly about three-quarters of a mile, and turning sharp round a long flat point, runs in a north-north-west direction. At $1\frac{1}{2}$ miles beyond this last point is the head of the tidal water, and where at times it is shallow enough to wade across. The waggon drift is about 20 miles farther up the river.

Snag rocks lie about half a mile off the mouth of Kei river, three of them being visible at high water. The outer or south-west rock is about half a cable long, but only a few feet broad ; its south-west end is 10 feet high. It lies E. by N. $\frac{1}{4}$ N., distant $1\frac{1}{2}$ miles from the east extreme of cape Morgan, and S.W., distant 8 cables from the eastern point of the Kei river.

Two other dry rocks lie from one to two cables northward and eastward of the above, and are 2 to 3 feet high.

Sunken rocks extend from 3 to 5 cables east and north-eastward of the highest rock, most of which are visible at low-water springs.

The sea breaks heavily all round the Snag rocks, and in bad weather the breakers extend nearly a quarter of a mile outside them.

Anchorage.—There is anchorage off the river in about 9 fathoms, with cape Morgan bearing W. by S. $\frac{1}{4}$ S., Snag rock West, and Sandy patch at river entrance N. $\frac{1}{4}$ W.

Tides.—It is high water, full and change, at Kei river at about 4h. 0m.; springs rise about 5 feet.

Current.—At about one mile off the Kei, the current was found invariably setting to the south-west, at the mean rate of $1\frac{1}{2}$ knots. At first quarter ebb, the stream from the river reached as far to the south-eastward as the anchorage, where it joined the coast current and both ran to the south-west together. During flood tide the influence of the stream was not sufficient to alter the general direction of the ship's head.

Bar.—Directions.—In consequence of the channels shifting, and the depths varying after gales or rain, strangers should not attempt to enter Kei river. From the anchorage a remarkable sand patch is seen on the face of the dark hill on the north shore of the river. This serves as a guide to the entrance, as the low ledge of sunken rocks extending from the northern shore is nearly in line with it, and it is from this point the river must be entered. If attempting to enter the river in case of necessity, a fair opportunity must be waited for, keeping a good look-out on the low ledge, over which the sea breaks furiously; and, when a favourable chance offers, pull in, keeping the rocky shore so close as to leave just sufficient room for the oars; probably there is not a less depth than 6 or 7 feet at low water over the bar. The breakers on the bar extend to the rocks only during heavy rollers, when of course the channel is impracticable.*

Landing outside.—If landing is decided upon, and the bar prove impassable, it may possibly be effected at a sandy spit, sheltered in some degree by a patch of sunken rocks to the southward of it; these rocks lie about one cable off shore at about three quarters of a mile to the southward of Kei river; the sea breaks violently over them.*

The flood stream sets north-eastward close in shore, and the ebb south-westward. Care must be taken in landing on the spit that,

* F. Skead, Master, R.N., 1858.

while waiting for a smooth, the boat be not swept too far to the north-east, for it was found on one occasion, when a whale boat of H.M.S. *Geyser* was swamped in endeavouring to pass through the surf, that the boat was not thrown on the spit by the rollers, but carried to the north-eastward by the flood tide into the breakers on the bar, thence into the river through the channel, and was not recovered until twelve hours afterwards. On the other hand, during the ebb tide equal care is necessary that the boat be not drifted to the south-westward, where the surf is so much heavier and the beach rocky.*

Landing in surf boats is sometimes practicable in the Sandy bay at $1\frac{1}{2}$ miles eastward of the Kei, and also at the beach near Kologha river.

COAST.—The only sand hills for a hundred miles eastward of the Kei are the sand bluff at Sandy point and a similar one 18 miles farther east. The coast between the Kei and these sand hills is covered with grass and bushes down to the beach.

Koko river is half a mile eastward of Kei river, and its mouth is generally closed at low water. The beach from Kei river eastward is fringed with rocks, and with the exception of a dark bushy hill 110 feet high, on the east side of Koko river, the shore is low and grassy. The shore thence trends to the entrance of Kologha river.

Kologha river is open at high water, and the channel in is close to the south-west point; a sand spit extends from the north-east point nearly across the entrance. The distance between the points is one-third of a mile. The shore from one mile south-west of Kologha river to 4 miles north-east of it is grassy, and covered with small hillocks about 10 feet above the ground, formed of ant hills over which has grown small bush, and when 4 or 5 miles distant are a conspicuous feature of this part of the coast.

The east hill at entrance of Kologha river is covered with dark bush and is about 150 feet high.

At 4 cables S.S.W. from the west point of Kologha river is a sunken rock, and at one cable west of the rock is the east end of a ledge which uncovers at low water, thence trending south-westward for half a mile. Eastward of the sunken rock are two others, bearing respectively from the west point of Kologha river S.S.E. $\frac{1}{2}$ E. 2 cables, and East nearly a third of a mile.

* F. Skead, Master, R.N., 1858.

Mound point.—From Kologha river the shore trends easterly 2 miles to Mound point ; the beach between is rocky and three small streams empty themselves.

Mound point has a small grassy hummock near its extremity, about 40 feet high ; at the back the land is uneven and rises to a height of 240 feet, at a distance of half a mile inland.

About $1\frac{1}{2}$ miles eastward of Mound point is Kobinnába river ; the beach between is fringed with rocks, and at a quarter of a mile S.W. $\frac{3}{4}$ W. from the west point of the river, is a sunken rock on which the sea generally breaks.

Kobinnába river is always open, and the tide runs up some 3 miles, where there is a ford. The rocky east point of the river has a grassy hummock about 20 feet high, and off the extremity of the point is a small rock visible at low water. About three-quarters of a mile beyond the river is the point of the same name, the shore between forming a sandy bight ; off the west part of this point are several rocks visible at low water. Within the point a hill rises almost immediately to 300 feet high, gradually sloping to the mouth of Nxaxa river.

Nxaxa river.—From Kobinnába point the shore trends eastward for $1\frac{1}{2}$ miles to Nxaxa river, the mouth of which is generally open ; the beach between is rocky. The west point of Nxaxa river is low and a stony reef extends off one cable in an easterly direction, close to which is the narrow channel into the river. The east point of the river is a small sand hill covered with bush, with a spit of sand stretching to within a short distance of the west side.

From Nxaxa river the shore trends $1\frac{1}{2}$ miles to Sandy point. The coast hills which rise precipitously from the sandy beach form a conspicuous ridge covered with dark bush, and faced with sand to some height, extending from Nxaxa river to about half a mile past the point, on which are four distinct peaks ; the third from the west, ward is the highest, being 280 feet above the sea.

SANDY POINT.—On sandy point is a small sand hill 75 feet high, covered with bush, and from it a stony point extends off nearly one cable. The hill is connected with the ridge behind by a high neck of sand.

Bowkers bay.—From Sandy point the shore curves north-eastward for two-thirds of a mile to a point, and thence northward half a mile to a small stream, the western of which is closed by a sand bank. This bight is known as Bowkers bay. The hill on the west

side of the western stream is 180 feet high, covered with bush and partially faced with sand.

Anchorage.—Landing.—H.M.S. *Active* found good anchorage, with shelter from westerly winds, in $10\frac{1}{2}$ fathoms, sandy bottom, one mile off the stream, and E.N.E. the same distance from Sandy point. This appears to be the best anchorage on this part of the coast, and is certainly the safest place for landing. The examination of the bay was made under favourable circumstances. The surf broke in 3 fathoms abreast the landing.

On the bank fronting the stream, and at the foot of the remarkable sandy hill, landing was effected in a whale boat manned by experienced boatmen from port Elizabeth.

Umfáni river, situated in the northern part of Bowkers bay, is open at high water; there are two small bushy-topped hillocks on the south-west side of this river. A third of a mile farther eastward is the mouth of Istamfoona river, which is also open at high water.

Between these rivers is a small rocky point, at the back of which, and forming a headland common to both rivers, is a remarkable black bushy peak, 255 feet in height, appearing in some directions as a double peak; sand extends up its sea face about 40 feet. At 3 cables S.S.E. $\frac{1}{2}$ E. from the mouth of Umfáni river is a sunken rock which frequently breaks; the beach to Stony point is fringed with outlying rocks to the distance of one cable.

COAST.—Stony point is low with outlying rocks, one cable from the shore; about half a cable from the point is a square rock 6 feet above high water.

Two breaking patches lie southward of Stony point, the outer is one cable long, and lies with the point bearing N. $\frac{1}{2}$ E., distant half a mile.

At two-thirds of a mile north-eastward of Stony point is the river Umtilwáne, the mouth of which is nearly closed, and half a mile beyond is the mouth of the Manubie; the shore between is low with a rocky beach, and skirted at a short distance with rocks. On the west side of Umtilwáne is a sharp black head 155 feet high; the east side is low.

Manubie river is open at high water, and has a long spit of sand running nearly across its mouth, the channel being on its west side. At the west point of entrance the land is 95 feet high, and covered with bush; the east point is low, being the extremity of a long ridge of beach hills which extend to the eastward and rise abruptly from the beach.

Off a point 4 cables eastward of the Manubie, are several rocks about one cable from the shore. At the back of the point is the highest peak of the ridge just mentioned, the whole of which is covered with bush.

About $1\frac{1}{2}$ miles eastward of the Manubie is the mouth of the Kleena, which is open at high water, and farther on is Mazeppa point; the shore between is rocky and sandy beach fringed with rocks.

Mazeppa point.—The hill over Mazeppa point is about 190 feet in height; the point may be identified by a grassy peaked islet, 26 feet high, lying 8 or 10 yards off it. There appears to be no dangers off Mazeppa point, but the sea breaks a considerable distance off in bad weather.

Mazeppa bay lies north-eastward of Mazeppa point, between it and Kogha river; small vessels have landed cargoes here in very fine weather, but with great difficulty; the best place is on the beach under the conspicuous sand hill, 190 feet high, just eastward of Nebbelelli river. In bad weather rollers set in right across the bay, and render it unsafe. A path runs from the western side of this bay up the ridge, through the Manubie forest, and continues up the ridges to the Natal road, about 30 miles from the coast, joining it a few miles east of the Butterworth mission station.

The Nebbelelli river lies about one mile north-eastward of Mazeppa point, and is open at high water; from its rocky east point a ledge dries out a distance of one cable to a patch of rocks. At this point a sandy beach commences, and continues for about a quarter of a mile, when the shore becomes rocky again. At the back of this sandy beach is the conspicuous sand hill before referred to; the sand extends up to its summit on the sea side, and the top and western slope is covered with dark bush.

The coast between Mazeppa bay and Bashee river is foul, with a heavy surf.

Kogha river is always open; a sand spit extends nearly across its mouth from the west point, the land over which is 150 feet high, and covered with bush. The east point is also bushy, 87 feet high, and from its base a rocky point extends to the south-west, off the extremity of which, distant about half a cable, is a low water rock.

The tide runs up Kogha river 4 or 5 miles, and its banks are high, and in many parts perpendicular. On its right bank, about 3 miles from its mouth, a thick bush commences, and extends about $2\frac{1}{2}$ miles to the north-west, nearly parallel to the river, and about a mile in

width ; it is dense, and known as the Manubie forest. Buffaloes are said to be numerous in this bush.

At two-thirds of a mile eastward of Kogha river is a low rocky point ; a small bight is formed between, in which are several low water rocks. About 2 cables westward from the point, and $1\frac{1}{2}$ cables off shore is a ledge of rocks 3 feet above high water. A sunken rock lies $1\frac{1}{2}$ cables from the point.

Juju river lies $1\frac{1}{2}$ miles eastward of the Kogha, and its mouth is generally open ; its west point is low and rocky. On the north-east bank of the river, a short distance from the mouth, is a dark bushy head about 90 feet high, and from its base a sand spit extends nearly across the river, leaving only a narrow channel. For half a mile eastward of the Juju the shore forms a bight with a rivulet at its head ; the beach is fringed with rocks, and at the back the land is low and grassy. On the east side of the bight a bushy head rises from the beach, with three peaks, about 80 feet in height.

At half a mile farther on is a stream which is open at high water ; and about half way between, and $1\frac{1}{2}$ cables off shore, are several rocks. The west point of the river has a small green hummock, 15 feet high, on its extremity, with a rock half a cable off.

From the east point of this stream the shore trends eastward $1\frac{1}{2}$ miles to Shekleen river, with low sandy hillocks, covered with bush, over the sandy beach. At the distance of two-thirds of a mile along the beach, and three-quarters of a cable from the shore, is a low sunken rock, from which to the next river are several outlying rocks. The coast rises to a height of 200 feet at half a mile inland.

Shekleen river is generally open, the channel running out close to the base of a remarkable green peak, 120 feet high, which drops perpendicularly on the west side of the river. The east side is low, with a long sandy beach in front of it. The shore then trends eastward one mile to Shekleen point, and a little more than half way is a small black head from which the land rises abruptly to a height of 275 feet.

Shekleen point projects some distance at low water, but at high water the sea washes the foot of the small bushy head which forms the point. It is about 50 feet high, and connected with the coast ridge by a low neck of sand and bush, and when seen from near the coast it appears as an islet.

At $1\frac{1}{2}$ miles to the north-east is Gnábie stream ; the beach between is rocky, with three other small streams. The land rises immediately from the beach to a considerable height, and is covered

with grass and bush. About $2\frac{1}{2}$ miles inland from the mouth of the Gnábie is a remarkable tree on a mound, conspicuous when seen from a vessel 5 or 6 miles off the coast.

Kunduluana river is a third of a mile farther eastward; at another third of a mile beyond is Kawka river; the land between rises steeply to a height of 150 feet, with a small bushy hill in front, the sea face of which is sand, about 30 feet high.

At 2 miles beyond the Kawka is the Gnabbákka river; the coast between is fringed with rocks, and a low ridge of bushy hills rise immediately from the beach, the land at the back of which is covered with grass and bush, and is 250 feet high at a distance of half a mile inland.

Landmark.—At half a mile south-west of Gnabbákka river there are some bushy hillocks faced with sand for 100 or 135 yards in length, and about 40 feet in height; the bushes extend down the middle of the sand nearly to the bottom, making it appear when some distance from the shore as two small sandy peaks, and which can be seen 8 or 10 miles off. This is the only sand which shows from any distance between Mazeppa bay and Bashee river.

Gnabbákka river has a wide entrance; the west point is low from which a sandy beach stretches across towards the east point and into the river; the mouth is common to two rivers; the eastern is the larger and the tide runs up it about five miles. The east point is high, grassy, and nearly perpendicular. Thence to Gnabbákka point the coast is nearly straight and rocky, the land attaining a height of from 200 to 300 feet at a distance of one third of a mile from the beach, and broken by several ravines.

Ingoma river is a small stream, and about $1\frac{1}{2}$ miles north-eastward of Gnabbákka point; half a mile farther eastward is Kabolla river; between the two rivers is a rocky point, and the coast is about 170 feet high.

From Kabolla river the coast, which is of high cliffs, trends south-eastward to Udwessa point, a dark bluff; the cliffs are perpendicular and 160 feet high, from which the land rises to a grassy peak 310 feet above the sea; a short distance east of which and somewhat higher is a dark bushy hill.

From Udwessa point (half a mile east of which the cliffs cease), the coast trends eastward for $1\frac{1}{4}$ miles to Amendu point, westward of which is the mouth of Amendu river; the shore in places is fringed with rocks.

Amendu point is a long rocky projection, with several outlying rocks. A sunken rock lies one cable E.S.E. from the outer low water rock, or about $2\frac{1}{2}$ cables off the point. On the point is a small bushy hillock 25 feet high, and a quarter of a mile inland on the east side of Amendu river, is a hill 115 feet high, covered with grass and bush. The Amendu river forces its way to the sea through a sandy spit, which stretches across from the east point.

Landing might possibly be effected about half a mile eastward of the rocks extending from Amendu point where also there is reported to be fair anchorage.

Between Amendu point and Bashee river, the shore is stony with a small sandy beach, from which the coast hills covered with bush rise about 60 feet high, backed by land about 180 feet above the sea. Between are two streams, and the western one is named Umandwana river.

BASHEE RIVER.—The entrance to Bashee river is about one-third of a mile wide. The west point is low and grassy, but about a quarter of a mile up the river on the right bank is a grassy hill 270 feet high; the hill on the east side of entrance is high and covered with bush. Sand spits extend from both points of the river, the eastern spit overlapping the western. The depth in the channel between (about 50 feet wide) is 3 feet at low water. The sea breaks for a distance of 2 cables or more outside the entrance.

Inside the entrance are three sand banks, which dry at low water. The channel is close along the west shore, between it and the sand banks. Above the sand banks the river expands to a fine sheet of water, running nearly straight for 2 miles in a N. by W. direction, with an average breadth of $1\frac{1}{2}$ cables. The banks of the river are steep, and on the west side are generally free from bush, but on the east side, from half a mile within the entrance, are covered with dense bush. Hippopotami abound in the river.*

About $1\frac{1}{2}$ miles up the river, and half a mile from the right bank, the dense Udwessa forest commences, and extending in a westerly direction for about 5 miles, is $1\frac{1}{2}$ miles in width, and at an average distance of a mile from the coast.

Anchorage.—H.M.S. *Active* (1877) anchored several times off the mouth of this river. A good berth is in $10\frac{1}{2}$ fathoms, sandy bottom, commanding the right bank of the river, with Amendu point

* See Admiralty chart:—Bashee river to Umtamvuna river, No. 2,087; scale, m = 0·29 inches.

W. by S. $\frac{1}{2}$ S., Bashee point E.N.E., and the west head of the river N.W. $\frac{1}{2}$ N. The rollers generally set in heavily after a strong westerly or south-westerly breeze, occasionally breaking in 6 or 7 fathoms, but generally off the mouth of the river in $3\frac{1}{2}$ or 4 fathoms.

Landing is dangerous as the breakers are confused. The following is the experience of H.M.S. *Active*, in 1887 :—

Landing was first made on the eastern spit in a whale boat, but the attempt to get off proving ineffectual, the boat was carried $1\frac{1}{2}$ miles to the westward to a sandy beach close to a small river, closed by a sand ridge, from which place, with great difficulty, the crew succeeded in returning to ship. On a second occasion, in attempting to land, the boat was capsized (apparently over rocky ground), one life was lost, the remainder of the crew reached the shore with difficulty. Several attempts were made to return to the ship but without success, and the crew had to go to East London.

Caution.—Before attempting to land on this beach, which is about 200 yards in length, and three-quarters of a mile north of Amendu point, the direction of the current outside the edge of the surf should be ascertained so as to avoid being set over the rocky ground which evidently extends from the shore on either side of the sandy beach. The rollers occasionally without warning break heavily a considerable distance outside the usual line of breakers.

Current.—The Agulhas current off this coast, generally sets about W. by S. or nearly in the direction of the coast at the rate of one to $3\frac{1}{2}$ knots an hour ; it is weak in strength near the coast, and strongest near the edge of the bank of soundings. It almost invariably sets to the westward in all the anchorages between East London and Bashee river, but sometimes, in fine weather, within a distance of about 2 miles from the coast, a weak current sets to the eastward ; this easterly set has occasionally been known to extend some 7 or 8 miles off the coast.

Bashee point.—From Bashee river a sandy shore curves slightly to Bashee point $1\frac{1}{2}$ miles distant. The high part of the point is bushy, and on the outer part is a small grassy-hummock. A rock lies a short distance off the point. From the westward, a sandy streak on the west side of a bushy hill, near the east side of entrance to the river is visible.

THE COAST between the Bashee and Umkomass rivers is fringed with outlying rocks for a distance varying from one to 5 cables from the shore.

Hole in the Wall.—At about 17 miles north-eastward of Bashee river are two remarkable rocks about 100 feet high. The south-western is flat-topped, has a natural archway, known as Hole in the Wall,* and is perforated at the base; the north-eastern and higher of the two has a cleft in the summit in the form of a wedge.

Whale rock point is about 70 feet high, and wooded for about 300 yards inland. The surrounding country is grass land, with the exception of two patches of trees between it and Umtata river to the westward. Whale rock lies off the point.

Rame head, situated about 15 miles westward of St. John river, is a bold rocky point, sloping gradually, with a small rock at its extremity. At about three-quarters of a mile off shore, a little to the westward of the head, there are depths of 8 to 10 fathoms.

Brazen head, about 5 miles to the north-east of Rame head, has from the eastward the appearance of two distinct points, densely wooded, steep, and bold. The summit is 809 feet above the sea.

Landmarks.—Between Rame head and Waterfall bluff, about 33 miles to the eastward, the coast is faced with a number of high bluffs, which does not occur on any other part of the coast, eastward or westward, for a long distance. St. John river lies about midway. Between Brazen head and St. John river is a Sugar Loaf rock, and to the westward of the rock is a remarkable green peak.

GORDON BAY is an indentation in the coast to the eastward of cape Hermes, and at the mouth of St. John river, with good anchorage and gradual decrease in the depths, but it is exposed from about E. by N. round by south to W. by N.†

Cape Hermes, the south extreme of Gordon bay, is distinguished by a round, grass-covered hill, 433 feet above the sea, with a white flag-staff on the summit, and by a rock 8 feet high at one cable off it; the north extreme of the bay has a similar hill over it, but neither so large nor so high as the other. The summit of the cape is in lat. $31^{\circ} 38' 6''$ S., long. $29^{\circ} 33' 16''$ E.

The shore for a third of a mile to the northward of the cape is rocky, whence a sandy beach extends to within the entrance of the river.

* Whichelo Bank.—Abreast of Hole in the Wall, and about 75 miles from land, a bank of soundings of from 42 to 48 fathoms, in lat. about $32^{\circ} 40'$ S., and long. from $30^{\circ} 10'$ E. to $30^{\circ} 45'$ E., is said to have been discovered by Captain Whichelo, in October 1847. This locality was partially examined by H.M.S. *Serpent*, in 1869, but bottom was not reached with from 100 to 200 fathoms of line.

† See Admiralty plan of St. John or Umsimvubu river, with view, No. 2,566; scale, $m = 6$ inches

Landing.—Just within the cape, at its junction with the sand, is a nook, named Pauls cove, where sometimes landing may be effected when the bar of the river is impracticable from the heavy surf upon it; the boats, if necessary, can thence be dragged along the beach into the river.

Close inshore during the flood tide of the river, which runs regularly, a strong current was found setting to the S.S.W. along the sandy shore inside the breakers, and to seaward along the rocky shore in the direction of cape Hermes. This current should not be forgotten in attempting to land with a flood tide, for, upon one occasion, it was found so strong that a cutter could barely stem it.

Should a boat be swamped in the surf, it would be almost impossible for the crew to reach the shore, as sharks are numerous and ravenous, both outside the surf and in the river.

The anchorage in 13 fathoms water, with cape Hermes N.W. by W. $\frac{1}{2}$ W., distant three-quarters of a mile, and Porpoise rock N. by W. $\frac{3}{4}$ W. $1\frac{1}{6}$ miles, was found to be good: but a berth closer in, about 8 fathoms, would probably be better. No current was experienced at the anchorage.

PORT OF ST. JOHN (Umzimvubu river) is navigable for vessels of 6 or 7 feet draught for about 11 miles, the difficulty being that of crossing the bar. The bottom, above the Gates, is very irregular, with shallow reaches and recurring deep holes, a depth of 56 feet having been found in one place. Below the Gates the banks are so steep that small craft may lie alongside the banks. The appearance of the land from off the mouth of this river is so remarkable that, having once seen it, or the sketch of it, is easily recognised again.* A lofty table mountain, 1,200 feet high, appears to have been cleft to its base, leaving a wedge-shaped gap in the centre, through which the river flows to the sea. The upper part of this table land, called St. John's Gates, is bare stratified sandstone rock, like Table mountain; but at 200 feet below a dense forest covers the cliffs to the edge of the river. The Gates are $1\frac{1}{4}$ miles from the entrance of the river; the western Gate, 1,239 feet high, is very steep; the eastern Gate, 1,163 feet high, has two distinct terraces of table-land with grass on it. Beyond the Gates the river becomes more open, and its banks are lined with reeds.

St. John river divides Pondoland into two nearly equal portions. West Pondoland is bounded by Umtata river, and East Pondoland is

* See Admiralty plan :—St. John or Umzimvubu river with view, No. 2,566 scale, m = 6'0 inches.

separated from the colony of Natal by the Umtavuna river. The "Great place" of the principal chief of Pondoland, is situated about 6 miles eastward of Palmerton, which latter is distant about 22 miles direct, both from St. John river entrance and port Grovenor. The country is well watered, and capable of supporting large herds of cattle; and near the coast the soil is said to be suitable to the growth of cotton, sugar, and coffee; copper is said to exist in various places.

There is a trading station named Whites station at 7 miles up the river, on the right bank, and about 2 miles beyond is a waggon drift, now known as Davis' drift, but it is a dangerous crossing. Small craft, drawing 6 feet, can navigate to within half a mile of the drift, and in many places can lie alongside the banks. There is plenty of good timber and limestone in the neighbourhood of the river.

Fort Harrison the site of which is 11 miles up the river, was dismantled in 1882, when the troops were removed to the settlement at the north of the river. The river is tidal to about one mile above the fort.

The bar begins at about a quarter of a mile southward of Porpoise rock, the east point of entrance to the river; its breadth is about one cable, and the average depth at low water is about 6 feet during the year. On both sides of the channel there are often heavy breakers and at times the sea breaks across the entrance for four or five successive days, and especially after S.W. gales, when the rollers are unusually high. The bar is of quicksand, constantly shifting; in December the channel is to the eastward near the Porpoise rock, but as the dry season advances it moves to the westward until June or July. In June, when the bed of the channel is to the westward, the depth on the bar may be reduced to 4 feet at low water, and in the rainy season it may be increased to about 8 feet, but the depth entirely depends on the quantity of the rainfall. The rainy season prevails from October to April.

Even during the unfavourable part of the year for small craft entering the river, it appears that except during very boisterous weather the bar is always practicable for surf boats.*

Settlement.—A settlement formed in 1883, and situated on the west bank of the river, contained in 1886, a population of 402, including 145 Europeans, military and civil. The Resident Magistrate is also Captain of the port.

There is a small wooden pier with derrick, just within the entrance, alongside which small craft might lie.

* See landing, page 161.

Supplies.—Provisions and good water are obtainable, but there are no facilities for repairs. Good timber and limestone are abundant.

Trade.—The value of the exports in 1885 amounted to £2,142, derived chiefly from hides, maize and gums; the imports, chiefly dry goods, amounted to £2,657.

Small steamers and other craft trade regularly to Natal; 15 entered in 1886 of the aggregate tonnage of 737. No other means of communication.

A surf boat, with surf warps, communicates with these vessels when anchored outside the bar.

Tides.—It is high water, full and change, at St. John river, at about 4h. 8m., and the rise is $5\frac{1}{4}$ feet.

St. John reef.—At about 2 miles eastward of the entrance to St. John river is Bluff point, the coast hills between ranging from 165 to 374 feet above the sea. The shore is skirted with rocks which extend in places to the distance of one cable. At 2 cables from the shore on the east side of Bluff point is St. John reef with 6 feet water at low springs, and deep water between it and the shore. From the reef cape Hermes bears W. $\frac{2}{4}$ S., distant $2\frac{6}{10}$ miles.

The COAST eastward of the St. John reef continues high for about $17\frac{1}{2}$ miles to Waterfall bluff. This part of the coast is cut into a number of ravines, through which small rivers appear to empty themselves into the sea, but none of them can be mistaken for the St. John, as they are much smaller and generally with sloping banks, whereas the sides of the St. John are precipitous. The Egosa forest stretches from St. John river to port Grovenor.*

Umzimkлава river is situated nearly 10 miles eastward of St. John river. Upon its eastern side is a round hill, with two remarkable rocks at its base, projecting into the sea. The Entafufu river lies about 4 miles south-westward, and the Umzimpanzi and Embotyi rivers at 3 and 4 miles north-eastward of it.

Waterfall Bluff is the easternmost of a succession of bluffs. It is about 200 feet high, and from its summit two large streams of water precipitate themselves into the sea; the westernmost fall enters the sea at one leap, but the fall of the eastern one is broken at about a third of the distance down.

These falls may be seen 7 or 8 miles off, but in dry weather the volume of water is probably much diminished, if not entirely dried up.

* See Admiralty chart.—Bashee river to Umtamvuna river, No. 2,087.

Port Grovenor.—The bight in the coast, known as port Grovenor (a vessel named *Grovenor* having been lost here) is situated about 3 miles north-eastward of Waterfall bluff; there appears to be little difficulty in landing goods here, or in transporting them to any part of Pondoland.. The Ubazi river enters the head of the bight.

A detached coral patch is reported to lie about 2 cables off the reef fronting the west point of the bay, or about half a mile off shore.

The Coast, eastward of Waterfall bluff, is moderately high inland, sloping gently down to the beach. In the wet season this coast appears beautiful, being clothed with bright green grass and clumps of trees and bushes, frequently relieved by streams and small cascades ; but a few weeks of drought probably greatly alters the appearance.

A bight similar to port Grovenor is charted about $4\frac{1}{2}$ miles to the eastward, and into which Umtzikaba river discharges. South Sand bluff, on its eastern side, is a remarkable round topped sand hill presenting a sandy bluff to the westward, the top being covered with dark bushes.

Another Sand bluff 22 miles farther eastward is somewhat similar, and exactly midway between these is a remarkable red topped hill, which is in sight from both bluffs. Observe that there is nothing which can be called a sand hill or bluff for 90 miles on either side of the above-mentioned, or in fact to the north-eastward until reaching Natal. Between these sand bluffs and port Natal there is nothing remarkable by which the coast may be recognised, except a bluff 418 feet high, about 11 miles west of cape Natal.

The Umtentu and Isikota rivers lie between South Sand bluff and the Red hill ; and the Umyameni, Umzamba, and Umtamvuna between the Red hill and North Sand bluff. The Untamvuna river is the southern boundary of Natal colony.

Within one mile southward of Impenjali river, at half a mile off shore are two sunken rocks. This river is situated about 8 miles north-eastward of the Umtamvuna.

Umzimkulu river may be easily recognised by the settlement, Port Shepstone, on the hill over the western bank, and by the white flagstaff on the west point of entrance.

The channel of the river has been deepened so that small craft may enter at high water. The inner water is spacious and navigable for several miles with fertile back country. Copper is found in the neighbourhood, at Insizwa.*

* See Admiralty chart.—Umtamvuna river to Tugela river, with view, No. 2088.

Red Topped hill, about 15 miles north-eastward of the Umzimkulu, and 60 miles south-west of cape Natal, has a native kraal in the valley just east of it. A similar hill, situated 8 miles north of red topped hill, is liable to be mistaken for it.

Umtwalume river is conspicuous, resembling St. John river, and is the only one with high steep banks northward of the Umzimkulu. When the river is open, a remarkable rocky peak is seen in the opening, and high up on the left bank are a few houses.

Besides the streams mentioned between St. John river and Natal, there are many minor ones about which we have no information beyond what is shown on the charts. The navigator will take notice that few soundings have been taken in the locality, and exercise caution accordingly.

Current.—From the mouth of the river Umtwalume in lat. $30^{\circ} 29'$ S. to cape Natal, a north-easterly current of about 2 miles an hour has been experienced in the month of May, at from one to 2 miles from the shore; whilst on the coast to the south-west of the river it was exactly the reverse. *See current, p. 166.*

Umzinto river.—Bank.—Between the parallels of about $30^{\circ} 22'$ and $30^{\circ} 24\frac{1}{2}'$ S. and $3\frac{1}{2}$ miles off the Umzinto river, near which river there are many houses and cultivated land, there are depths of 10 to 14 fathoms extending in a N.E. by E. direction, over a space of more than 2 miles. From the latter depth no bottom was obtained.

ALIWAL SHOAL.—This dangerous rocky shoal is within a depth of 5 fathoms, about 7 cables in length, one cable in breadth, $2\frac{1}{2}$ miles off Green point, and in the track of vessels bound along the coast to and from port Natal. Its north extreme, in lat. $30^{\circ} 15\frac{1}{4}'$ S., long. $30^{\circ} 50'$ E., has only a depth of $1\frac{1}{2}$ fathoms, with from 14 to 17 fathoms at 2 cables distant.*

From the shoalest part of the Aliwal, the mouth of the Umcomass river bears N. $\frac{1}{2}$ E. distant $3\frac{3}{4}$ miles, Green point beacons are in line, and the mouth of the Umpambinyoni river W. by N. $3\frac{3}{4}$ miles. The depths within the shoal are from 12 to 15 fathoms.

Beacons.—A mast beacon, 70 feet high, 228 feet above the sea, and surmounted by a triangle, has been erected on the hill behind Green point, about 500 yards distant from a pyramidal beacon 28 feet high, surmounted by a cask, on Green point; these beacons in line on a N.W. $\frac{1}{2}$ W. bearing, point to the direction of Aliwal shoal. The

* Captain P. Aldrich, H.M. Surveying Vessel *Sylvia*, 1884. *See plan and view on chart No. 2,088; also views of the coast on No. 643.*

beacon on the hill has been recognized from a distance of 14 miles. A white house just east of Ifafa river, and one mile inland, is also a useful day mark, when approaching from the south-westward.

At night, vessels should not stand into a less depth than 40 fathoms.

Current.—A strong current is found to set over Aliwal shoal in a south-west direction, but midway between the shoal and Green point it is reduced to one mile or less; at times a counter current sets to the north-eastward. See also current, p. 165.

Umkomass river lies 3 miles northward of Green point, and has about 6 feet over the bar at high water; the Umpambinyoni or Bloody river lies 2 miles to the southward, with a house on the south point of entrance; its mouth is apparently choked by a sand bank.

Northward of the Umkomass river, at $5\frac{1}{2}$ miles distant, is the mouth of the Illova, and at the further distance of 9 miles and 2 miles eastward of False bluff, is the Umlazi river, which drains the Ipisingo flat and sugar plantations. There are several steam mills near the river. Unless certain of the latitude, this part of the coast should not be approached without due caution on account of the Aliwal shoal.

CAPE NATAL.—From Green point, the shore trends north-eastward about 27 miles to cape Natal. About 11 miles westward of the cape is False bluff 418 feet high, which, before the erection of the lighthouse on cape Natal, was often mistaken for it. Cape Natal is a high wooded tongue of land, terminating in a remarkable bluff 195 feet high, and is easily made out, the coast to the northward falling a little back and being low for several miles. At the foot of the bluff on its eastern side, flat rock 20 feet high and about 40 feet long, projects seaward, and thence rocks which uncover at low water springs extend to the north-west towards the bar.*

There are no outlying dangers in approaching the cape and the water is deep close to the land.† On the bluff is a light tower 81 feet high, and painted white, also a flag staff and watch house; and on its north-west side at the foot of the bluff are two white leading marks for the bar. See light, page 167.

To the southward of the cape the coast is of moderate elevation near the sea, and broken in several places by the mouths of rivers and streams. The hills rise inland to a considerable height, and the

* See Admiralty plan :—Port Natal with views, No. 643; scale, $m = 5\cdot8$ inches.

† Bank.—A bank of 12 fathoms, said to lie about 3 miles eastward of Natal bluff, was unsuccessfully searched for by Navigating Lieutenant Skead, in 1887.

landscape strikes the visitor who is familiar with the white sands and stunted brushwood of South Africa as one of great richness and fertility. To the northward of the cape, as before remarked, the coast is low and sandy, with bushes a few yards from the beach, but the character of the country is very similar inland, although somewhat more thickly wooded than the coast to the southward.

PORT NATAL, although not naturally a good harbour, is of great commercial importance, as it is the only inlet capable of affording the least shelter in the Colony, and which causes it to be the outlet of the produce of an extensive and valuable region.

It consists of a large bay, almost filled with sand and mud banks dry at low water, and sheltered at its entrance by cape Natal. There are no streams of importance falling into the inlet, so that the entrance is only kept open by the scour of the receding tide between the piers in course of construction for that purpose, and by dredging. It is anticipated that the harbour may in time be open to large ocean-going vessels.

Vessels of about 15 feet draught may usually cross the bar at high water, but the depth and direction of the channel is subject to much variation. *See Bar*, p. 169.

LIGHTS.—The tower on cape Natal exhibits at 282 feet above high water, a *revolving* white light attaining its greatest brilliancy *every minute*, and visible in clear weather from a distance of 24 miles. The light does not open clear of the land until it bears northward of N. 57° E., nor is it visible from Aliwal shoal. Position of lighthouse, lat. 29° 52' 40" S., long. 31° 3' 50" E.

Three fixed *white* lights, placed triangularly, are shown from the Rocket house, on the coast northward of the port entrance, and bearing N. by W. $\frac{3}{4}$ W., distant $1\frac{1}{2}$ miles from cape Natal lighthouse.

A fixed *red* light is shown from the seaward end of the new North (Milne) pier.

A *red* light is exhibited at night, under the direction of the harbour master, for the information of the pilots, when the bar is considered dangerous or impracticable.

Anchorage.—The anchorage off port Natal may safely be approached at night by the lead, the decrease of soundings being regular. The best berth is in 10 fathoms, with the lighthouse bearing S.W. by S. distant about $1\frac{1}{2}$ miles, and the Rocket house beacon W. by N. The holding ground is good, but there is no shelter with southerly and easterly winds, and there is nearly always a heavy swell along the coast. In a more southerly position, the outset of the tide is more felt, swinging vessels broadside to the swell, and causing

them to roll heavily; the ground is also encumbered with lost anchors and cables.

It is recommended to lie at single anchor with 70 fathoms of chain, and to sight the anchor occasionally. In the event of parting, and not being able to work out, vessels should run for the beach abreast the Rocket house, keeping the head sails set, and remaining by the vessel until communication with the shore is established by the rocket apparatus.

If apprehensive of bad weather on arrival in the road, a sailing vessel should anchor in 16 fathoms, $2\frac{1}{2}$ miles from the lighthouse, from which position she would be able to fetch out on one tack or the other, with the wind from any quarter.* See Winds, p. 172.

Caution.—When the wind is inclined to freshen from the south-eastward, with a long swell and high barometer, vessels should proceed to sea as soon as possible. The head lighthouse keeper states in his report that the heavy seas from the south-eastward, which at times occur, are generally preceded by an unusually low range of barometer for three or four days before the seas are felt here.

Pilots.—Vessels intending to enter port Natal, and in want of pilots, should anchor in the road. A signal being made, a pilot will be sent off from the port office, or if the surf on the bar is too heavy, it will be communicated by the Commercial Code of signals; see also bad weather cones, p. 172. A steam tug may be had. H.M. ships are supplied with pilots free of expense.

Directions.—The light on cape Natal not being visible from the Aliwal shoal, care must be taken in making for port Natal from the south-west, not to approach the shore nearer than 4 miles, or stand in to a less depth than 40 fathoms water, until the light is in sight from the deck, when the vessel will be northward of the Aliwal. Southward of port Natal the soundings are coarse gray sand and stones, whilst to the northward fine black sand will be found. The light kept in sight will also lead outside all known dangers while to the southward of Umlazi river ($9\frac{1}{2}$ miles from the lighthouse); but when northward of the Umlazi river, keep a long mile from the land. When the lighthouse bears W.N.W. steer for the anchorage. From seaward the masts of vessels in port will be visible when the north end of cape Natal bears westward of W. by N. See bar directions, p. 170.

* In December 1874, eight vessels were in the anchorage, waiting to cross the bar, when a south-easter came on; 2 were driven ashore and all hands lost, 2 were dismasted, one lost her rudder, and the remainder dragged and lost their anchors.

Detention of vessels outside has much decreased since that time, See page 170.

THE PORT.—A breakwater, about 700 yards long, named the Milne, or New North pier, has been constructed in an east north-east direction from Sandy point, the west point of the entrance to the port, and a similar one is in course of construction from the foot of the bluff opposite ; a length of 270 feet was added to it in 1887 ; these breakwaters, by narrowing the channel, are intended to give greater force to the out going stream and so clear the sand. Dredging and blasting operations are being carried out with the object of admitting heavy draught vessels. The old north pier, or breakwater, locally known at Vetch's pier, situated 4 cables northward of Sandy point, is in course of removal to the level of ordinary spring tides ; at the extreme outer end there is a large iron triangle, surmounted by a circular plate.

A space within Sandy point extending about $3\frac{1}{2}$ miles, east and west, and nearly 2 miles north and south, is almost filled with mud, with boat channels in various directions. On the southern side are some large mangrove islands, and elsewhere around this space are mangroves and mangrove swamps. The part available for a harbour is confined to a narrow channel about a cable in breadth and about $1\frac{1}{2}$ miles in length, with depths varying from 7 to 20 feet ; this is in course of being improved by dredging.

The Bar of sand which crosses the mouth of the port is constantly changing both in direction and depth, and should never be attempted by a stranger. It is silted up by the ocean swell, and scoured out by the force of the ebb, which has been found at times to deepen the water 12 inches in one tide.

When re-sounded in 1887, the depth between the piers was about 10 feet at low water, excepting the shoal in mid-channel which had as little as 7 feet ; thence seaward over the bar through the northern channel, 13 feet on the leading marks (19 feet at high water springs), but this channel was very narrow near the fairway buoy in 21 feet, which marks the entrance. The breadth of the bar has much decreased. The south channel appears to have had about 3 feet less ; a buoy lies in about 18 feet just northward of the entrance. These buoys must in no case be depended on.*

There is less water on the bar after southerly winds than at any other time in consequence of the sand being washed in ; but south-

* During 1885, the greatest depth on the bar was 10 feet at low water, and the least depth 5 feet ; and in 1887, $12\frac{1}{2}$ feet (January), $8\frac{1}{4}$ feet (July). Three vessels drawing over 15 feet crossed the bar in 1885 ; eight in 1886, and eight in 1887 ; deepest draught 15 feet 8 inches. A vessel drawing 16 feet 9 inches crossed the bar in December 1886, (but she took the ground abreast the Bluff marks) ; the Italian vessel of war *Dogali* drawing 17 feet, crossed in October 1888.

westerly winds and rain deepen the bar. From June to the end of August is the time when the bar is shallowest. (*See Bad Weather Cones, page 172, and Lights, page 167.*)

The average detention in crossing the bar (1885-6) was $1\frac{1}{2}$ days, maximum, 23 days in August 1886; also in March and November 1885, vessels were detained 19 days. These appear to be exceptional cases. In 1887, the average detention was 0.75 days; 58 vessels entered without anchoring; one vessel was detained 17 days.

Directions.—If, through any cause, a vessel whose draught will admit, should be forced to run over the bar without a pilot, steer for the two white leading marks at the foot of the bluff on the west side, in line; this will lead through the north channel and to the foot of the bluff, where, being in smooth water, the vessel may anchor off the bar leading marks, at the foot of the bluff, and wait for a pilot. From abreast the bluff marks, vessels may pass close southward of boathouse shoal to the wharves.

Caution.—On arriving in the road, it will be well to inquire the line of the channel with reference to the bluff leading marks.

Berthing.—Vessels lie in the northern part of the harbour under Sandy point, and within about 2 cables of the custom house, port office, wharves, &c., and from whence a railway runs to Durban. The berthing space is very limited on account of the banks, but it is being increased by dredging. A good berth for a small vessel of war is to moor head and stern alongside the wharf, in about 14 feet, at low water; but sand is blown on board during south-west winds. The mail steamers generally lie in the Bluff channel. At the outer set of moorings in this channel, a vessel drawing over 12 feet can lie afloat. All vessels are compelled to take in or make fast to Government moorings, of which there are several sets.

Durban, the town of port Natal, stands about $1\frac{1}{2}$ miles from Sandy point, on a low flat, and is about 54 miles by road, and 70 by rail, from Maritzburg, the capital of the colony. It is well laid out, with side streets lined with trees, and a tramway runs to Sandy point. The houses are principally built of wood. Here there is an Episcopalian church and Wesleyan chapel, banks, mechanics' institute, several clubs and societies, a market place, &c. The population in 1886 was about 16,400, half of whom are Europeans. Most of the wealthy inhabitants dwell on the Berea, a wooded height overlooking the town.

Shipping.—In 1886, 112 vessels anchored in the road, 111 of which were steam vessels. 213 vessels entered the harbour, 54 of

which were steam vessels. 26 had to lighten in the road before entering. In 1887, 198 vessels entered the harbour. For trade of the colony, *see page 4.*

Communication.—Port Natal is in telegraphic communication with the towns of the Cape Colony, and with Aden, &c., by submarine cable, *via* Delagoa bay and Zanzibar; the cable is landed at about 3 miles northward of Durban, near the Umgeni river; there is railway communication from Durban to Maritzburg. *See also page 8.*

Supplies.—Water and provisions may be obtained, and are sent off in surf boats or tugs to vessels lying in the roads. In the harbour supplies may be obtained at moderate prices.

Repairs.—The railway and other workshops can undertake large repairs to hull and machinery; a large shaft can be turned, cylinders of 96 inches cast and bored, and castings of 10 tons made, there is also a steam hammer of 4 tons. There is a steam crane capable of lifting 20 tons.

Hospital.—The Government hospital, situated within one mile of the shipping, admits all classes; there are no diseases due to climatic causes, nor special quarantine or customs regulations.

Patent Slip.—There is a patent slip capable of taking a vessel of 500 tons burthen.

Coal.—A large quantity of coal is kept in stock; it is taken off in lighters (of which there are a great number), to vessels in the road, at a cost of about 45s. per ton, but the exposed anchorage renders coaling there a tedious proceeding. Vessels drawing 14 feet can coal alongside the wharves in the harbour. The coalfields, situated about 18 miles beyond Ladysmith, 189 miles from Durban, are being developed, and the coal has been certified to be good for steaming purposes. There is railway communication between the coalfields and port Natal.

Time signal.—The signal is a ball, which is dropped daily, except Sundays, at 1 h. 0 m. p.m., Durban observatory, mean time, equivalent to 22 h. 55 m. 59 s. Greenwich mean time. When signal fails in accuracy, a blue flag with white centre is hoisted at the Time ball staging, about 1 h. 5 m. p.m., as a notice that the signal cannot be relied on.

The signal is made from a position $3\frac{1}{2}$ cables N.N.W. $\frac{1}{2}$ W. from Sandy point, north side of entrance to Port Natal.

The Durban observatory is situated on the Berea range, about 3 miles from the time signal at the point.

Signal Staff.—There is a signal staff and semaphore at the port office near Sandy point.

Bad weather signal.—The average number of bad weather cones hoisted per month during 1885–6, were 7; maximum 17 in September, 14 in February, 2 in June. In 1887, they were considerably less, full cones (bar impracticable) being hoisted on 13 days only, and half cones (bar dangerous) 23 days. By full cone is meant, hoisted right up, and half cone at half mast.

A Life-boat is kept at Sandy point, and the harbour master has a small steam-tug for the service of the port. The steamer is sent off to communicate with men-of-war on their arrival.

Tides.—In the port of Natal, the time of high water at full and change is 4 h. 30 m., the greatest rise is 6 feet. The velocity of the ebb at springs is about 3 miles in the Bluff channel and the flood about $2\frac{1}{2}$ miles.

In the road, outside the bar, the flood stream sets nearly north and the ebb in the opposite direction.

Current.—It is necessary to caution vessels against the strong current which prevails on the coast of Natal beyond a distance of about 3 miles; it generally sets to the south-west at the rate of 2 to 3 miles an hour. Eastward of Natal, within that distance, as far as O'Neill peak, no current is felt; there the Mozambique current will be met, sometimes running as much as 3 knots an hour close in to cape St. Lucia. *See page 178.*

Winds and Weather.—The prevailing winds at Natal are from N.E. to East, and from S.W. to South, and in about equal proportions alternating throughout the year in periods seldom exceeding a few days for either. In the year 1886, 157 days' winds were registered from the former quarter with a maximum force 9, and 145 from the latter with a maximum force 10, the wind on the remaining days of the year, four excepted, were from between South and East; on 4 days winds were registered from W.S.W. to N.E. by N.

From April to June the proportion of N.E. winds to S.W. winds was 37 to 25. November to February 38 to 47.

During the remaining months the winds were about equally divided.

The wet season in Natal is from October to March, but rain occurs occasionally at all times of the year.* After a continuance of rain, the mercury rising all the time, an easterly gale follows, when the weather clears. May, June and July are the finest months, a light breeze coming in from seaward during the day, and a breeze from the land during the night, but strong gales blow both from the eastward and westward even during these months. August,

* During September to December, 1887, inclusive, 9·3 inches was the amount of the rainfall at Durban. The gauge has only recently been set up.

September and October are the most boisterous months, when the range of barometer is great, and the gales alternate between east and west. The gales from the eastward blow about south-east at 50 or 100 miles to seaward, but are deflected on reaching the coast to E.N.E. or N.E., and it is the swell set up by the wind at S.E. so far seaward, which, catching the vessels at anchor in Natal road, on the starboard bow, heading to the wind, which causes them to ride so uneasily, and when they part their cables to cant towards the shore (*see* remarks on gales, pages 10-12 and climate, pp. 18, 19).

COAST.—Between cape Natal and the entrance to Tugela river, a distance of about 46 miles, several small streams fall into the sea ; the principal are, the Umgeni, Umhlanga, Umhloti, Tongaati, Umhlali, Umvoti, Nonoti, and the Sinkwassi. The hill 450 feet high, just south of the Umhloti is conspicuous, and has a clump of trees on it. The southern bank of the Umvoti has two sand patches close down to the sea. The south point of the Sinkwassi is a sand hill, with a wooded top. The coast hills range from 250 to 550 feet high, and are backed by dense bush.

The coast may be safely approached to one mile. At this distance no bottom will be found at 12 fathoms, until close off the Tugela.*

Morewood cove, about 23 miles north-eastward of Natal, is said to have a seam of coal in its vicinity. The red cliff southward of the cove, is conspicuous.

Landmarks.—The most remarkable landmarks between port Natal and the Tugela river are :—

A red cliff, divided by bushes nearly to the water, situated just southward of Morewood cove. A remarkable red bluff, about a quarter of a mile inland, and 1½ miles southward of the Umvoti river, in lat. 29° 25' S. Half a mile northward of this bluff is a well-wooded ravine. Conspicuous red ravines show against the green hills, marking either side of the Sinkwassi river.

TUGELA RIVER, forming the northern boundary of the Natal Colony, is easily recognized from seaward by its southern head, composed of dark bush, thickly wooded, the red hill on its northern shore, which has a conical nob on its summit, and several patches of red clay to the northward. The river is useless for transport in the dry season, when boats ground repeatedly.†

* See Admiralty chart :—Umtamvuna river to Tugela river, No. 2,088.

† See Admiralty charts :—Umtamvuna river to Tugela river, No. 2088 ; Tugela river to Delagoa bay, No. 2089 ; Scale m= 0·17 inches. Remarks on the coast between Tugela river and St. Lucia bay are from the Navigating Lieutenants of H.M. Ships *Active*, *Tenedos* and *Forrester*, 1879.

The discharge from this river is observed several miles seaward ; the bottom is rocky at the anchorage, but has a thick covering of mud, the deposit from the river.

The bar is impassable, and although with very smooth water apparently a landing might be effected at the northern side of the entrance, it would be attended with great danger, as the beach is fringed with rocks.

Anchorage.—At the mouth of the Tugela river the water shoals gradually to 5 fathoms, which depth will be found about 200 yards from the breakers. The anchorage off Tugela river affords no protection against westerly winds. Should a strong breeze blow from that quarter, a vessel should at once proceed to sea.

The best anchorage is in 9 to 10 fathoms, with the red hill on the north side bearing N.W. $\frac{1}{2}$ N., and the small red-topped hill near the Inyoni river N.N.E. $\frac{1}{2}$ E.

A reef, on which the sea breaks very heavily, about half a mile from the shore, extends for a considerable distance along the coast from the northern point of the river ; $4\frac{1}{2}$ fathoms was found 300 yards from the breakers.

The coast from the Tugela river trends in a north-easterly direction, the hills rise gradually from the beach, showing grassy and cultivated valleys between, but there is no wood near the sea northward of the Tugela river. Several red patches on the hills are noticeable.

Amatikulu river.—Eight miles north-east of the Tugela river is a very dark bushy head about 300 feet in height, the most remarkable headland in the neighbourhood ; it makes as a conical hill from the north-eastward, and forms the southern side of the Amatikulu river. This river is entirely barred by sand, extending in a long bushy-topped spit nearly to the north shore. No out-flow was observed, although the water could be seen from aloft. The north side of the river is marked by a red hill similar in appearance and height (280 feet) to the red hill at the Tugela river, but is farther from the beach ; several large kraals were observed in the neighbourhood. The Inyoni river lies about midway between the Tugela and Amatikulu rivers ; its east point of entrance may be known by a red-topped hill, which shows well in certain lights against the higher land behind.

This part of the coast should not be approached nearer than $2\frac{1}{2}$ miles, where 9 to 12 fathoms will be obtained.

About $1\frac{1}{2}$ miles eastward of Amatikulu river, the ranges of hills near the coast gradually become lower, and a large quantity of white sand shows along the beach nearly as far as Durnford point.

Umlalaz river.—The coast immediately northward of Amatikulu river presents no features of interest, the vicinity may be recognized by the beach hills being faced with sand, but of less elevation (a noticeable difference when north of the Tugela river). Vedette hill, situated about 9 miles northward of the Amatikulu, and one mile southward of the entrance to Umlalaz river, is conspicuous from the southward ; from a distance, its summit (which is a bushy top with white sand on either side) appearing as a dip or fork in the hill.

The mouth of the Umlalaz was examined by Commander I. W. Brackenbury, R.N., who, with a party of exploration, rode over from the camp at fort Chelmsford on the Inyezane, a distance of about 10 miles. Just within the entrance the river forms a lagoon at the back of the sand hills on the north point; beyond the lagoon the river sweeps round the hills on the south side, with a breadth of about 90 feet, a clear beautiful stream deepening quickly from the south bank, apparently deep enough for the largest boats, and reported to continue so as far as the first drift.* Two of the party waded across the river at its mouth, and found about 3 feet water (about half ebb), with a stream running out about 2 knots an hour. The water off the mouth of the river was discoloured for a considerable distance, but it was breaking at about 50 yards from the beach.

Glenton reef, lying between the Amatikulu and Umlalaz river, is steep-to, and always breaks. Its northern extreme lies nearly abreast Vedette hill, and extends about $1\frac{1}{2}$ miles off shore ; thence towards the Amatikulu it gradually merges into the shore breakers. The sea sometimes breaks without warning in 5 fathoms of water in the vicinity of Glenton reef.

Tenedos shoal, lying midway between the Umlalaz river and Durnford bay, extends nearly 2 miles from the shore and is steep-to ; the least water obtained was 9 feet, but there is probably less among the breakers. There is a narrow passage between this shoal and the shore, having 3 to $4\frac{1}{2}$ fathoms water, but it ought not to be attempted, except in boats, and then only in smooth water. In calm weather,

* This was in April 1879, or just at the end of the rainy season, when the river was probably swollen ; there was a gentle off-shore breeze : no attempt appears to have been made to land here.

although the surf breaks heavily on the beach, there is often no indication of the shoal.

The landing inside Tenedos shoal does not seem to be at all improved by the breaking of the rollers, as there was far more surf here than at Durnford bay.

DURNFORD BAY is the name applied to the slight indentation in the coast off the mouth of the Umlatuzana, a small river situated about 8 miles westward of Durnford point. The mouth of the river, which is generally blocked by sand, may be recognized by a conical sand hill about a quarter of a mile eastward of it, at the foot of a well-wooded range of hills; it has a remarkable belt of white sand on its eastern side, the remainder of the hill being only partly covered with sand; also by Grassy hill, at 1½ miles westward of the river, with patches of wood near its extremities. The hills on each side of the entrance being more wooded than those more remote, present at a distance a dark patch, and serve to identify it.

Anchorage may be obtained in Durnford bay in 5 to 6 fathoms, coral, sand, and black mud, about half a mile from the shore, with the entrance of the Umlatuzana river bearing from N.W. to N.N.E., and Durford point E. ½ N.

It is a very good anchorage in easterly winds, but with those from westward a heavy sea gets up, and heavy rollers set in, necessitating proceeding to sea.

Between Durnford bay and point a fairly even bottom exists, the average depth being 4 to 5 fathoms within half a mile, and 6 to 8 fathoms at about 2 miles from the shore.

Directions.—Approaching from the south-westward, keep Durnford point northward of E. by N. ½ N., until the sand hill on the east point of the Umlatuzana river bears N. by E., when steer for it to the anchorage.

Landing.—There is occasional landing at the mouth of the Umlatuzana river.

Commissariat stores were landed here without much difficulty, in July and August, by surf boats brought from Algoa bay, but the landing was not so good as during the months of May and June.

Durnford point is a bluff, in lat. 28° 55' S., long. 31° 59' E., and may be recognized by the square-topped hill over the point, the cleared land to the west of it, and also a sandy streak on the north side resembling a road. The hill can be seen nearly as far northward as cape St. Lucia.

From the point a ridge of mountains takes its rise, and striking directly to the westward, increases in height and magnitude as it advances into the interior. This ridge is from 3,000 to 6,000 feet high.

Shoal.—The bottom around Durnford point for a distance of one to two miles is rocky, with depths of $3\frac{1}{2}$ to 4 fathoms only; it is advisable to give it a berth of 3 miles.

From Durnford point the land trends gradually to the northward for about 4 miles, the beach hills being of moderate elevation and covered with bush; from thence to the Umlatús river are bare sand-hills, and sand-hills covered with brushwood.

RICHARDS BAY, into which the Umlatús river empties itself, about $4\frac{1}{2}$ miles northward of Durnford point, appears to have an even bottom, shoaling gradually to 5 fathoms close to the breakers.

Within a mile of the beach northward of Richards bay the soundings vary from 10 to $6\frac{1}{2}$ fathoms; abreast O'Neill peak 9 to 6 fathoms, coral; deepening again a short distance to the northward to 13 fathoms, no bottom.

From the mast-head of H.M.S. *Forester* at anchor off the mouth of Umlatús river, the bar appeared to extend from a half to one mile off shore, fairly smooth on its southern part, but breaking heavily on its northern part, the lagoon within being quite distinct. Landing is considered impracticable, though perhaps, after still weather, it might be possible.

A bare round-topped sand mound marks the northern point of the entrance of Umlatús river. A short distance to the northward of this mound is a well-defined black hill, which from seaward makes as a point; the beach hills thence to O'Neill peak are of moderate elevation, faced with sand.

Southward of the river the shore is sandy and backed by low sand-hills.

Anchorage.—There is good fine weather anchorage in 11 fathoms with O'Neill peak N.E. by E. $\frac{1}{2}$ E.; bare sand mound North; and Durnford point W. by S.

O'Neill peak, 395 feet high and dark, is easily recognised by a small cone in the centre of the range, which is more thickly wooded than the surrounding hills; there are no dark hills within 5 miles to the southward of it.

COAST.—The coast northward of Richards bay is fringed by a range of hills which become almost destitute of vegetation as cape St. Lucia is approached, again becoming thickly wooded between the cape and St. Lucia river. Off the east point of Richards bay the

shore should be approached with caution, as the bottom was found to be irregular; $5\frac{1}{2}$ fathoms was found at nearly one mile off-shore.

Zulu shoal, reported in 1875 in lat. $28^{\circ} 51' S.$, long. $32^{\circ} 6' E.$ $1\frac{1}{2}$ miles off-shore, has been unsuccessfully searched for. Possibly the Zulu struck on the shoal of $3\frac{1}{2}$ fathoms (or less), situated one mile off-shore, and $1\frac{1}{2}$ miles north-eastward of Durnford point.

The surf breaks heavily along the whole of this coast.

Cone point, 4 miles south-westward from cape St. Lucia, has a conical hill of bare sand on it, and north-eastward is a round-topped bare sand-hill, 380 feet high, appearing as a sharp summit when approaching it from the northward.

CAPE ST. LUCIA is a low rounded point of sand with a hill at the back rising to the height of 500 feet. At about 2 miles northward of the cape is a ledge of light brown coloured rocks.

From the eastward it makes like a number of islands, which are the summits of the various sand-hills comprising the cape; the most conspicuous is Sharp peak, 630 feet high, about 2 miles northward of the cape.* From Sharp peak the range extends to the northward, ranging from 400 to 600 feet in height; it is covered with stunted brushwood, its base being devoid of vegetation, and ending abruptly in the bluff hill which marks St. Lucia river.

Current.—Off cape St. Lucia, the Mozambique current sets to the south-westward, in the direction of the coast, at the rate of 2 to 3 knots an hour; at times, it sets close in to the cape. This current is usually found within one mile of the shore as far northward as Kosi river; thence to Delagoa bay, within 3 miles of the shore, the current is seldom felt. Occasionally, in-shore, a counter current of one knot an hour is felt along the whole of this coast. Strong southerly winds raise a considerable sea northward of cape St. Lucia.

Winds.—At times, with a rather low barometer and light easterly winds, strong south-west winds almost amounting to a gale spring up in this neighbourhood with but little warning; the barometer then rises quickly. In August, during one of these blows, it rose to 30·6 inches.†

ST. LUCIA BAY, an indentation of the coast 9 miles northward of the cape of the same name, may be recognised by a conspicuous sugar-loaf hill of sand, 200 feet high, about one mile from the south point of entrance to St. Lucia lake. This hill is not seen when approaching from the southward until it bears westward of N.N.W. At about 4 miles northward of the lake, a conspicuous square-topped sand hill, 330 feet high, rises from the beach.

* See view on chart, No. 2,089.

† H.M.S. *Forrester*, 1879

Anchorage.—The bay is exposed to winds from S.S.W. through east to N.E.; the bottom is sand, gradually decreasing in depth to the shore, and is good holding ground. A good berth in 10 fathoms, is with Sugar-loaf hill bearing W. $\frac{1}{4}$ S., and a remarkable square-topped hill N.N.E. $\frac{1}{4}$ E. H.M.S. *Sylvia* (1884) rode out a fresh S.W. gale in this berth; but with the wind more to the southward it would be necessary to put to sea. With the Sugar-loaf bearing northward of West the bottom is foul.*

Landing.—The best place for landing is under the Sugar-loaf; here, H.M.S. *Goshawk*'s boats effected landing, also boats from H.M.S. *Rapid*, March, 1886, during exceptionally fine weather and off-shore winds; the bar of the river was not practicable. After north-easterly or easterly winds, a swell rolls in and causes heavy breakers on the beach, thus rendering landing impracticable in ship's boats. North of the river the breakers extend a long distance seaward. Sharks appear numerous and voracious, as they several times attempted to seize the oars and lead of the boat employed sounding.

St. Lucia river and lake.—In the dry season the entrance to St. Lucia river is completely blocked by a dry sand bar, which is annually swept away by the floods; but apparently there is never more than a depth of 3 or 4 feet at high water, and with heavy breakers right across it. The bar was not practicable when seen by *Sylvia* in August and January, though it was open.

Discoloured water from the river extends at times some distance seaward.

St. Lucia river trends north-eastward about 12 miles parallel to the coast, and distant from it about 2 miles, entering the south end of the lake abreast cape Vidal. The lake is about 35 miles in length, 10 miles average breadth, and with a depth of about 9 feet. The eastern side of the lake is separated from the sea by a strip of land about 3 miles across, with sand hills from 300 to 500 feet high.

COAST.—At 8 miles northward of St. Lucia river is a conspicuous sand-slip, from whence to cape Vidal, a further distance of 9 miles, is a range of dark-coloured steep hills of even height. Detached rocks lie a short distance off the projecting points.

Cape Vidal rises to a remarkable peak, 500 feet high, and when bearing N.W. by W. shows a long triangular patch of sand, extending one-third of the way up the hill; when seen from the southward it has two reddish coloured patches on it.

*See plan of St. Lucia bay, on Admiralty chart, No. 2,089.

The shore from cape Vidal to the north-east end of Inyack island, Delagoa bay, a distance of about 132 miles, trends north-eastward, in a nearly straight line. The coast, which is moderately high close to the beach, is a continuous line of sand-hills from 50 to 500 or 600 feet high. There are a few straggling black rocks along the shore.

Towards cape Colatto, Delagoa bay, the land is well wooded. The interior southward of Delagoa appears to be a low level country, with some knots of trees here and there like park land, but about 10 or 12 miles inland, a few hills apparently 800 or 1,000 feet high, are visible.

Leven point, 12 miles northward of cape Vidal, may be known when bearing northward of West, by four sand roads, extending from the sea to the summit of the coast hills, 9 miles north of cape Vidal, and are useful marks for Leadsman shoal.

Leadsman shoal, a small patch of coral, about half a mile long, has $2\frac{1}{2}$ fathoms water, and lies nearly one mile from the shore, with Leven point bearing S.W. $\frac{1}{2}$ S. distant 6 miles.

Another coral patch, with 4 fathoms water, lies $3\frac{1}{2}$ miles N.E. of Leadsman shoal. Vessels should not navigate between the above shoals and the land, or approach them to a less depth than 20 fathoms.

Havergal hill, at 21 miles north-east of Leven point, is a conical hill, 465 feet high, with a flat top, and a sand road from base to summit.

Sordwana bay.—At about 2 miles north-east of Havergal hill is a slightly projecting point, on the north side of which is a shallow bight about 2 cables in extent, known as Sordwana bay, but scarcely deserving this appellation ; its south-east point, on which there is a hut and flagstaff at about 30 feet above the sea, is in lat. $27^{\circ} 32' 22''$ S., long. $32^{\circ} 41' 39''$ E.* The dark bluff 150 feet in height, behind the flagstaff is covered with scrub, and conspicuous from seaward ; the coast northward of it is composed of sand hills, ranging from 40 to 200 feet in height.

A small stream enters the sea at the head of the bay ; it is but 20 feet wide at its entrance, which dries 4 feet at low water springs, rock bottom. This stream carries off the surplus water from two lagoons a short distance inland ; the nearer, half a mile distant from the bay, is about half a mile in extent, covered with grass, and is very shallow. There are but few natives in the neighbourhood, the land being covered with scrub and unsuitable for agriculture.

* See plan of Sordwana road, on Admiralty chart, No. 2,089. The description of the coast between St. Lucia river and Delagoa bay is from the survey of Captain Pelham Aldrich, H.M.S. *Sylvia*, 1884 ; Sordwana road, with information on, by Commander T. F. Pullen, H.M.S. *Stork*, 1889.

Landing.—A reef, about one cable in extent, extends north-eastward from the point of the bay affording some slight protection to the landing place, but owing to the heavy surf and rollers usually prevailing, landing is dangerous and impracticable at times even to surf boats.

Anchorage.—Temporary anchorage may be taken by steam-vessels, in the road, in about 7 fathoms at half a mile off shore; with the flagstaff on the point bearing S.W. $\frac{1}{2}$ W. distant about three-quarters of a mile. The holding ground is not good, being partly rock, and is more foul nearer the shore; there is also considerable swell here, and strong on-shore winds would render the anchorage untenable. The anchorage is open to winds from seaward between N.E. and S.W., and is no better than that off other parts of this coast.

Coast.—At 8 miles northward of Sordwana bay is the point of the same name, rising to a hill 485 feet high. Lava hill is a grassy hill with a sharp summit; somewhat lower is a long streak of red sand.

Boteler point, at 19 miles north-eastward of Sordwana point, projects a short distance as a dark rocky cliff, 15 feet high. Near Boteler point are two high and conspicuous hills, named the Paps, a good land mark, probably Lava hill is one of them.

Black rock is a low rock lying at the foot of the sand hills, $3\frac{1}{2}$ miles northward of Boteler point.

Kosi river.—The entrance to Kosi river, in lat. $26^{\circ} 53' S.$, is conspicuous from the north-eastward. Rollers break across the mouth which appeared very shallow.*

At $1\frac{1}{4}$ miles southward of the river, a reef extends half a mile off shore.

Oro point, at 3 miles northward of Kosi river, is a low, dark, cliffy point resembling Boteler point; it rises to the coast range in Oro peak, about 390 feet high. Foul ground extends half a mile northward from Oro point.

Landmarks.—At 7 miles northward of Oro point are three peaked hills about $1\frac{1}{2}$ miles apart, the highest, named Florence peak is 400 feet high; these are conspicuous landmarks from all directions; the land is cleared of bush just northward of Florence peak.

At 13 miles northward of Oro point, shoal rocky ground 3 miles long fronts the coast to a distance of $1\frac{1}{2}$ miles. Fish are plentiful here.

Steamer rock, 10 miles southward of cape Colatto, has the appearance of the hull of a steam vessel low down on the beach.

* Captain Barnes, R. Mail s.s. *Florence*, states that he passed this river during strong southerly winds and high sea, but saw no break across its mouth, which appeared to be about one mile wide.

Cape Colatto, or Santa Maria, a round-topped hill 260 feet high, is the northern extremity of Inyack peninsula, which, with Inyack island and its shoals, form the eastern boundary of Delagoa bay.

Inyack peninsula is separated from the island by a sunken reef through which there is no passage.

INYACK ISLAND, to the northward of Inyack peninsula, is about 6 miles long, north-east and south-west, by $3\frac{1}{2}$ miles across. Inyack hill, 385 feet high, situated 2 miles south of cape Inyack, is wooded, and has a dome-shaped summit. The north-western part of the island is low, and encloses a shallow lagoon. The north extreme of Black bluff, the west point of the island, has a flag staff and a white barrack on its summit; at one mile southward of the barrack is the highest part of the bluff, 177 feet above the sea, with a red streak down its northern face, but these marks are not seen when eastward of the island. It will be again referred to in connection with Delagoa bay.

Cape Inyack, the north-east extreme of the island, has a steep face, with a sand hill on its extremity and tolerably level land adjoining, and is not unlike cape Natal. The east coast of Inyack may be approached to about one mile.*

Danae shoal, within a depth of 10 fathoms, is about $1\frac{1}{2}$ miles in extent, with a least depth of 5 fathoms, for which cape Inyack bears S.W. by W $\frac{1}{4}$ W., distant $4\frac{1}{2}$ miles; the square-topped sand hummock forming the cape is also in line with the white sand patch, 265 feet above the sea, on the hills at the back of the cape. From the head of the shoal, depths of 13 to 17 fathoms will be found as far southward as the cape; its extent to the northward is not charted.

Five Fathom bank.—A bank with 5 fathoms water, and depths of 7 to 8 fathoms charted to the distance of 2 miles southward of it, lies about 10 miles N.E. $\frac{1}{2}$ E. of Danae shoal. The locality is better avoided.

DELAGOA BAY, also known as Lorenzo Marques after its discoverer, who was one of the earliest of the Portuguese navigators, belongs to the kingdom of Portugal. The entrance is obstructed by shoals, extending for a distance of 20 miles northward of Inyack island, terminating in Cutfield flat, north-westward of which is the north or main channel to the bay; the depths between the flats vary from 4 to 7 fathoms in the navigable channels. Vessels of 24 feet draught can cross the bar to the town.

Between Elephant island and English river, the bay is 15 miles across, southward of which it extends about 20 miles. Three rivers

empty themselves into the bay, viz :—the King George, the English river, and the Maputa. The great deposit ejected by these streams has caused shallows and flats, which renders the navigation of the bay, particularly in the southern portions, somewhat intricate. The depths in the navigable parts of the bay vary from 6 to 12 fathoms, all good anchorage ground.*

CHANNELS.—North, or Main channel lies between the north extreme of Cutfield flat and the shore, a distance of about 5 miles, with depths of 7 to 8 fathoms in the fairway between. This channel is doubtless the best one for a large vessel. Cutfield flat is generally visible by the colour of the water. Westward of the fairway, at about 3 miles westward of the north end of Cutfield flat, is the south end of a bank, 2 miles in length, fronting the shore, with depths of 3 to 5 fathoms. The least depth, 3 fathoms, is on its north extreme, and one mile off shore. The water apparently deepens again westward of this bank to 6 fathoms. *See* directions, p. 186.

Cockburn channel, with depth of 4 to 8 fathoms, over a breadth of about one mile, lies along the north-east side of Cockburn shoal, between it and Hope shoals. Vessels from the southward, of moderate draught, enter by this channel; directions are given on page 187.

There is said to be a passage with not less than 4 fathoms, over the Hope shoals, formerly taken by vessels; its direction is nearly East from Fawn shoal. H.M.S. *Fawn* proceeded to sea on one occasion by that route nearly, and found no difficulty. The colour of the water does not sufficiently indicate the shoal patches for this passage to be recommended. The tide is said to set fairly through, but no marks can be given for it.

SHOALS in the approach.—Cockburn shoal is the name of the extensive flat with from one to 3 fathoms, which occupies the whole space lying between the north point of Inyack island and Elephant island, a distance of 5 miles. It is triangular in shape, and its northern point terminates in a 3-fathom patch, with 8 fathoms close beyond it, lying with Gibbon point bearing S.S.W. $\frac{1}{4}$ W. distant $4\frac{3}{4}$ miles, and the sand patch on cape Inyack, S. by E. $\frac{3}{4}$ E.; the shoal may be said to occupy the whole space between these bearings, and there is no passage through it.

Hope shoals, within a depth of 5 fathoms, are about 5 miles in length, in a north and south direction, with patches of $2\frac{1}{2}$ and 3 fathoms in many places.

* See Admiralty charts:—Tugela river to Delagoa bay, No. 2,089; Delagoa bay to river Zambesi, No. 648; and plan of Delagoa bay, No. 644; Scale $m = 1\cdot0$ inch. Directions amended from survey of Captain Aldrich, H.M.S. *Fawn*, 1882-4.

Domett shoals, with about the same depth of water, lie northward of the Hope; there are probably some deep water channels between the patches, but the locality has not been fully examined.

Cutfield flat, the northernmost of this chain of shoals, is, within a depth of 3 fathoms, 4 miles in extent in a north and south direction; many patches of 2 fathoms, coral bottom, were found on this flat. Its north extreme lies with the sand patch on cape Inyack, bearing S. $\frac{1}{2}$ W., distant $19\frac{1}{2}$ miles, and Cutfield hummock, N. $\frac{1}{4}$ E., distant $6\frac{1}{2}$ miles.

The shoals mentioned break in places during and after strong south-west winds.

Patches.—At about 10 miles north-eastward of Cutfield flat, and about 4 miles off shore, is a patch of $3\frac{1}{4}$ fathoms, the southernmost of the patches extending from Lagoa shoal, described on page 195. About midway between this patch and the Cutfield, there is a patch of $5\frac{1}{2}$ fathoms. Tide rips are often seen about here, probably caused by the uneven bottom.*

Shefina reef, on the western side of the main channel, and abreast Hope and Cockburn shoals, is apparently dry at low water, and extends about $4\frac{1}{2}$ miles in an E.S.E. direction from the north-east point of Shefina island. Shoal and discoloured water extends a further distance of $1\frac{1}{2}$ miles south-eastward from the point of Shefina reef, at which distance there is a depth of about $3\frac{1}{2}$ fathoms.

Fawn shoal, an isolated patch of $2\frac{1}{2}$ fathoms, lies about a quarter of a mile southward of this shoal water, with Gibbon point bearing S. $\frac{3}{4}$ E., distant $5\frac{1}{10}$ miles.

Lech reef, with $1\frac{1}{2}$ fathoms water and 7 fathoms close-to, is the termination of the shoal water extending $1\frac{1}{2}$ miles southward of Shefina reef. Vessels must keep southward of a line joining Lech reef and Fawn shoal.

Clearing mark.—The red streak (177 feet) on Inyack island in line with Gibbon point, leads eastward of these dangers. See view B. on plan.

A bank, about $1\frac{1}{2}$ miles in extent, within a depth of 5 fathoms, lies in the fairway to the anchorage in Delagoa bay. A patch of $2\frac{1}{4}$ fathoms near its centre, lies with Reuben point light bearing

*H.M.S. *Brisk* in proceeding to sea in 1860, after rounding Cutfield flat and when it was considered that the vessel was well clear of the bay, the soundings shoaled in some places to 6 fathoms rather suddenly, when several miles out to seaward. The bottom appears to be a succession of sand ridges, with 6 and 7 fathoms on them, and from 9 to 11 fathoms between the ridges.

W. $\frac{3}{4}$ N. distant about $7\frac{1}{4}$ miles; there are similar depths on the north end of the bank. A projecting horn from the bar of English river, lies about 2 miles S.W. by W. from the centre of this bank, on the south side of the anchorage, with a depth of 2 fathoms near its extreme. This concludes the description of the important shoals bordering the channels from seaward to the anchorage.

Shefina island, between 4 and 5 miles in length east and west, stretches off the west shore of the bay, at the mouth of George river. It is low, sandy, covered with dense bush, and abounds in deer and other game, difficult to get at; water may be obtained. The lower part of the island is all white sand, and at a distance it is difficult to distinguish the island from the main land.

LIGHT.—On Reuben point, north point of entrance to English river, above a small tower, is exhibited a fixed white light visible in clear weather about 10 miles. Within the river the light is not visible when bearing southward of E. $\frac{1}{2}$ S.

LANDMARKS.—Beacons.—A white beacon, with ball, 75 feet high, situated on the southern end of Shefina islands, is visible from a distance of about 7 miles. (*Existence doubtful.*)

On Gibbon point, a sand hummock 19 feet high at the west extreme of Elephant island, there is a triangular beacon, surmounted by a disc 37 feet above the sea.

Black bluff and Red streak on Inyack island, and Mount Colatto to the southward somewhat resembling a haystack, are also useful landmarks. *See* sketches on plan.

George hill, the summit of the island of that name, may be of use when nearing Shefina reef, but it is not conspicuous, being but little above the land about it.

Cutfield hummock.—From the northward, or for vessels intending to enter by the northern channel, Cutfield hummock, 26 miles northward of Inyack island, is rather a conspicuous landmark. It is higher than the surrounding coast hills (210 feet above high water), and there is no land behind it. From seaward it appears with a bushy top, and southward of it the hills are also bushy, whilst to the northward they are mostly sand. Approaching it from the southward, bearing about N. by W., which leads eastward of Cutfield flat, it appears with two peaks, the southern one dark, the other slightly higher, with a streak of sand along the top. It is visible about 16 miles. When inside Cutfield flat, the hummock appears with a large streak of sand down it.

Tides.—The time of high water, full and change, at port Melville, is 4h. 30m., rise 15 feet; and at the Portuguese factory in English river, 5h. 20m., rise 12 feet.

Seaward of the shoals, the flood sets to the northward at the rate of 2 knots, with a strong indraught towards Cockburn channel, across which it sets obliquely. The ebb sets in an opposite direction.

Within the shoals the flood sets to the south-westward through the channel, over Shefina reef and towards English river at the rate of from one to 3 knots. The ebb sets in the opposite direction.

DIRECTIONS.—North or Main channel.—Pilots for Delagoa bay are not to be obtained. Heavy draught vessels are recommended to take the North channel, as there are patches of 4 fathoms in the Cockburn channel, and the tides set obliquely across it.

Vessels from the northward should make the land about the parallel of $25^{\circ} 30' S.$, avoiding Lagoa shoal, and endeavour to identify the remarkable ridge of bare sand hills, with four cones on its summit, 290 feet high, westward of that shoal; and also Cutfield hummock; thence steering so as to be within 3 miles of the hummock before it bears northward of N.W., to clear Cutfield flats, when proceed as directed below, for vessels having rounded the flats from the southward. Inyack hill will, in fine weather, be visible northward of Cutfield flats.*

Vessels from the southward may pass cape Inyack at from one to 2 miles distant, thence steering N. by E. (westward of Danae shoal) about 20 miles, taking care not to bring cape Inyack southward of the bearing S. by W. $\frac{1}{2}$ W., until Cutfield hummock bears N. by W., or more westerly, which will lead clear, and at least one mile eastward of all the shoals. With the hummock on that bearing, it may be steered for, and there being no other object to assist in determining the distance from it, the approximate distance should be obtained by means of an angle of elevation, (210 feet). When between 2 and 3 miles from the hummock, the course may be altered to the south-westward to bring it to bear N. by E. $\frac{3}{4}$ E., which bearing should be maintained until approaching Fawn shoal. This course may be continued past Fawn shoal, provided Black bluff on Inyack island is on with or just open eastward of Gibbon point (View B.)†, which mark leads eastward of Fawn shoal and Shefina reefs, and to the entrance of port Melville (page 193).

* See footnote, p. 184.

† Mount Colatto, seen between Gibbon point and Elephant island, appears a good mark for leading midway between Cockburn and Fawn shoals.

But, for proceeding to the anchorage off English river, when the white sand patch on cape Inyack bears S.E. $\frac{1}{2}$ S., alter course to W. by N. for a distance of 5 miles, passing about one mile southward of Lech reef, when the beacon on the south point of Shefina island (if correctly charted,) should bear W.N.W. ; then steer for it on that bearing, passing about half a mile northward of the bank fronting the anchorage, until about 2 miles from the beacon, then haul south-westward to the anchorage. Or proceeding to the anchorage southward of this bank, from the position where cape Inyack bears S.E. $\frac{1}{2}$ S., steer W. $\frac{1}{2}$ S., until the sand patch on cape Inyack is in line with or just southward of Gibbon point beacon, bearing S.E. by E. $\frac{1}{2}$ E. ; this mark astern, if discernible, will lead southward of the bank in about $4\frac{1}{2}$ fathoms, and to the anchorage. *See anchorage, p. 188.*

The beacon on Shefina island bearing N.N.W. also apparently leads southward of the bank. Bearings of Reuben point bluff, 200 feet high, may also prove useful on approaching English river. *See description, page 188.*

At night, in favourable weather, vessels may approach Delagoa bay by the lead, if certain of being well to the northward of Inyack island, taking care not to stand into less than 10 or 12 fathoms, when they may anchor or stand off according to circumstances.

Cockburn or South channel has a least depth of 4 fathoms at low water over a breadth of one mile, and the telegraph ships, drawing 24 feet, made use of this channel. It is not recommended for heavy draught vessels as there is generally a swell, and the tide sets obliquely across, the flood to the westward and the ebb to the eastward.

Moderate draught vessels, from the southward, having passed cape Inyack at the distance of one mile, should steer N.N.W. $\frac{1}{2}$ W., until the white barrack on Black bluff is in line with the Red streak on the higher land southward of it, bearing S.E., when cape Inyack should be brought to bear S. by E. $\frac{1}{4}$ E. ; this bearing kept on astern, will lead through the channel, bearing in mind the cross set of the tide. When the red streak comes in line with Gibbon point (sand hillock, 19 feet high, with bushes on it at the west extreme of Elephant island) the vessel will be past the north extreme of Cockburn shoal, and course may be altered to S.W., until the white barrack is in line with Gibbon point, view B ; thence a direct course may be steered for it if bound to port Melville, for which, *see pages 193, 194.*

If bound to the anchorage off English river, follow the directions given for North channel, from view B, page 186, when cape Inyack bears S.E. $\frac{1}{2}$ S.

Anchorage.—A good position off English river, in from $4\frac{1}{2}$ to 5 fathoms appears to be with Shefina south-west point N.N.W., and Reuben point W. $\frac{3}{4}$ N. There is a depth of about $3\frac{1}{2}$ fathoms, 2 miles nearer Reuben point.

ENGLISH RIVER (Esperito Santo).—This river lies in the western portion of Delagoa bay, and forms an excellent land-locked harbour, indeed the only one at present for large vessels, between the cape of Good Hope and Mozambique. The shores of English river are generally low and wooded. Reuben point (ponta Vermelha), on the north side of entrance, is a bold red bluff about 200 feet high, rising abruptly from the sea, with a light (page 185), and the signal station on it. Mawhone point, on the Catembe shore, south side of entrance, has two faces of red earth, which at times show well against the dark foliage adjacent.*

Beacons.—Two beacons, erected on the south side of entrance to English river, within Mawhone point, mark the northern limit of best water over the bar; the front beacon is 36 feet in height, the back beacon is higher and on rising ground; their positions are not definitely known.

A red buoy is said to mark the shoal water, extending S.S.E. of Reuben point, in 19 feet, but it must not be depended on.

It is stated that the channels are to be buoyed, and that a pilot will be appointed by the harbour authorities.

Bar.—Directions.—The bar of English river has about 14 feet at low water springs, and about 25 or 26 feet at high water springs, over a breadth of two miles. Shallow water extends rather more than halfway across the entrance from Mawhone point, and a sand spit of $1\frac{1}{2}$ fathoms and less extends E. by N., 3 miles from Mawhone point; the southern tail of the bar stretches to a distance of 7 miles eastward of the same point.

The beacons in line bearing W. $\frac{1}{2}$ S., mark the northern limit of the best water over the bar, but they are difficult to distinguish. Reuben point may apparently be steered for from the outside anchorage, bearing about W. $\frac{3}{4}$ N. until Mawhone point bears S.W., then steer S.W. by W. $\frac{1}{2}$ W., until Lechmere point comes open of Reuben point,

* See Admiralty plan:—English river, No. 646; scale, $m = 1\cdot9$ inches; this plan, bearing date 1822, must be used with considerable caution.

then haul gradually to the westward so as to pass Reuben point at the distance of half a mile, and southward of the buoy marking the shoal water off it.

The *Dunbar Castle* steam vessel, drawing 24 feet 6 inches, has crossed the bar.

Anchorage.—A vessel may anchor in 9 fathoms, with the fort flagstaff N.E. by E., and Lechmere point N.W. $\frac{1}{4}$ W., or anywhere along the north-east side of the river below Lechmere point, giving a berth, however, to a mud flat, which extends off some distance between the fort and Reuben point. Vessels lying here should be moored, particularly about the time of spring tides. The bight between Mawhone and Lechmere points is all shallow. Above Lechmere point there is apparently deep water nearly all the way to Refuge island.

Lorenzo Marques.—The Portuguese town of this name, the southernmost establishment of that nation on the east coast of Africa, is on the north bank of English river, about $1\frac{1}{2}$ miles within Reuben point. The fort is in a dilapidated condition, but apparently suffices as a stronghold for the Portuguese garrison in case of attack from the natives. The establishment is almost surrounded by a swamp, and this appears to have been the reason for choosing it as a military position, but it is consequently very unhealthy.

Drainage works in connection with the railway, will, it is said, render the site more healthy.

• The most conspicuous buildings at Lorenzo Marques, are the church, a fine looking structure, on the hill at the back of the town, a large hospital not far from it, and the recently built Government offices, close to the wooden landing pier.

The Eastern Telegraph Company's station is about half a mile west of the lighthouse, where the cables are brought in from Aden and Durban. Their positions in the channels will be seen on the plan.

Position.—The telegraph station is in long. $32^{\circ} 35' 34''$ E., determined by telegraphic connection with Cape Town, in 1881.

Population (1886) is about 8,000; natives in the district about 20,000.

Piers.—The railway company have constructed two piers with wharfage between; one of the piers is intended to have a depth of 24 feet alongside at low water. A boat camber and Custom house piers are to be built by the Public Works Department. Westward of the fort is a wooden pier, dry at low water.

Products.—The shores of Delagoa bay are divided into various kingdoms or tribes, which, at the time of Captain Owen's survey, 1822, were thickly populated. The land is generally of moderate elevation, with a rich dry soil, but lakes of stagnant water also abound. The sugar canes, indigo, pumpkins, pines, and numerous other fruits are indigenous, also the orchilla weed, from which a valuable dye is made. Rice, maize, millet, &c., are plentiful ; also honey, beeswax, dye woods, tortoiseshell, amber, gum-copal, furs, hides, india-rubber, and ivory. The country in the vicinity of the rivers abounds in elk, and hippopotami.

Shipping.—Sixty-four vessels entered in 1886, forty-six were steamers, 43 of them being English ; also 18 sailing vessels, total tonnage 36,500. In 1883, 22 steam vessels and 18 sailing vessels entered. The imports amounted to £76,000, and the exports to £29,000. A fair amount of cargo is received at this port from Mozambique, and Portuguese and Banian passengers are frequently backward and forward.

Communication.—*See page 8.*

Supplies.—Poultry, eggs, bananas, and pine apples are to be obtained in moderate quantities. Beef may be purchased, but it is better to purchase the animals and kill them on board. Machinery for a first-class foundry has arrived. The Government hospital receives foreigners and seamen, gratis.

Boats might be sent for water to Dundas river, about 6 miles up, where the water is fresh, and where wood also is procurable. Water is to be brought into the railway goods station ; a supply is obtainable at about 26s. per ton.

Coal.—The Eastern Telegraph Company have a store of coal, about 300 to 400 tons, but it is not for sale, though in urgent cases a few tons might be obtained. It is probable that the railway company will, in due course, maintain a supply of coal sufficiently large to supply the shipping, which will then be able to coal alongside the pier, to be built by the company.

A railway, about 50 miles in length, connects the town with a station on the Komah river and the Transvaal frontier ; it is proposed to extend it to Pretoria.

Winds.—Seasons.—The barometer rises with southerly and falls with northerly winds. From September to March the weather is mostly fine, although it is the rainy season. At this season the fine weather is accompanied by strong sea breezes at E.N.E., succeeded by

light land winds at night. After some days fine weather the sea breeze fails, and rain comes on with southerly or south-westerly winds. South-westerly gales of 36 hours duration are not unfrequent, blowing a gale which draws to the southward, and becoming fine at S.E. The wind then draws round gradually to N.E., and it continues fine for a few days, then undergoes a similar change. Bad weather always comes on with winds from west to south, improving as they draw round to east.

The regular sea breezes in the bay are from S.E. and East, and are mostly succeeded by land winds, but at times the sea breeze only relaxes in strength for two or three nights running.

Climate.—Delagoa bay has acquired the reputation of being very unhealthy for Europeans. It was whilst engaged in the survey of the rivers in particular that the climate proved so fatal to the officers and men under Captain Owen. But there is no reason to suppose that port Melville is particularly unhealthy, as it is exposed to the sea breezes and at a considerable distance from any rivers; on the contrary, Inyack island is said to be used by the natives as a sanatorium.

Mattoll river is the northernmost tributary of English river. It is 320 yards wide, and 16 feet deep, at the junction; at 8 miles above, its width diminishes to 30 yards, and depth to 8 feet, above which boats can ascend but a short distance. This river is salt as well as the Tembi, but, under the guidance of a native, a good supply of water may be obtained on the bank above the junction.

Tembi (Catembe) river, the southernmost of the three tributaries of English river, is broader and deeper than the Mattoll. Including the windings of the river, the boats under Captain Owen's orders ascended 46 miles, when the river divided into two branches. A short distance up the southern branch, it was found to be about 80 feet broad. Vessels drawing 13 feet can navigate the Tembi for a distance of 19 miles from its mouth. Some of the land is under cultivation, and fresh water is abundant, but the river water is salt.

Umvalus, Impalus or Dundas river (also called Lorenzo Marques) is between the Tembi and the Mattoll; it has the advantage of its water being fresh a few miles up, and is navigable for good-sized cargo boats as far as Bombai, about 10 miles from its entrance, probably near the ford, which boats can only cross at high water. A short distance below the ford the river is 80 yards wide, and 10 feet deep.

Maputa river runs into the south-west part of Delagoa bay, from whence there are two channels through the flats, one of which leads to port Melville, and the other towards English river. The Maputa is said to be navigable for boats for 60 miles, up to June, but later in the dry season they probably would not get beyond the limit of tidal influence, which was found during springs to extend to Moham, 35 miles from its mouth, where a rise of 2 feet was noted ; at high water springs, a depth of 3 fathoms can be carried through the channels in the flats to the entrance to Maputa river.*

For about 17 miles up the river, the banks are of low alluvial soil lined with forests of mangroves, after which it is a fine open country with sandy soil, the banks being about 6 feet above high water. Here there are beautiful plains extending about 2 miles back on either side of the river, and fine ranges of hills were passed before reaching the foot of the Libomba mountains. The narrowest part is 60 yards wide, and its greatest breadth at the mouth and fork 300 and 150 yards.

For the first 20 miles, 18 feet water was carried (April), the next 50 miles an average of 6 feet, the next 30 miles about 4 feet, and the last 30 miles about 2 feet, gradually shoaling to where the river could be forded. The ford is 2 miles beyond the fork up the Umzutu river.

The ebb tide at the entrance runs very strong for about 7 hours, and from $2\frac{1}{2}$ to 5 knots in some of the bends of the river. Great difficulty would be experienced in navigating beyond Moham in boats not having steam power, owing to the narrowness of the channel, and the strong current running down.†

King George (Manica) river runs into Delagoa bay to the northward of Shefina island. The main stream rises near Leydenburg, in the Bomba mountains, at about an elevation of 6,000 feet, its chief affluents are the Salibala, on the upper waters of which are the new gold fields, the Umgerania, and the Umlamase ; the country around them is fine and healthy. The coast lands drained by them are fertile, but too unhealthy for Europeans. The mouth of King George river has a shifting bar of various depths, and the river frequently bursts its banks to find other outlets in the great bay,

* The *Cockburn* tender, under the orders of Captain Owen, appears to have ascended about 20 miles (her draught of water being 8 feet), and the boats explored as far as 40 miles from the mouth of the river, but they did not proceed any farther on account of the fatal fever which attacked the crew ; 7 only out of a crew of 20 returned. The mosquitoes at night were intolerable.

† Commander Cochrane, H.M.S. *Petrel*, March 1869, and Lieutenant H. O'Niell June 1879, H.M. Consul, at Mozambique.

one apparently passing westward of Shéfina island. From its entrance, it trends with numerous windings, parallel to the coast as far as Cutfield hummock, when it turns inland. Captain Owen's expedition carried 22 feet into the river at high water, and ascended nearly 50 miles, then gave up the exploration on account of fever attacking the crew. The current ran $2\frac{1}{2}$ knots, and the water was fresh close to the mouth.

Mr. Hillard reports having ascended the river from 120 to 140 miles in the trading cutter *Herald*, the depth of water being 12 to 18 feet in the channel, and from 6 to 9 feet near the banks for the whole distance, the cutter frequently brushing the banks with her mainsail, whilst having plenty of water under foot. Only one shallow (6 feet) was found in the whole distance of 120 or 140 miles. On the west side lies a ridge of high land, which approaches the river at a few points, but is frequently separated by a flat marshy tract of country many miles in width, and densely covered with a coarse kind of guinea grass, 5 or 6 feet high.

On the east side there flats of a similar kind ; from the highest point attained by the expedition, these flats were only bounded by the horizon. The banks cannot easily be penetrated where the grass has not been burnt, and it is necessary to be careful in landing, as they are in some places honeycombed with pitfalls for hippopotami and other animals. For some miles from the mouth the banks are more or less covered with bush and mangrove jungles, but for many miles of the upper part of the journey there is no timber, except here and there a straggling fir tree, bent over the river by the force of the S.E. winds. Above the influence of the tide the river becomes narrower and very serpentine.

Captain Elton (1870) crossed the river by a ferry near Magud's kraals about 30 miles from its mouth, where he says it is a magnificent river, with a navigable channel of deep water for almost its entire breadth. Sugar-cane, cotton and indigo grow well on the banks of the river.

PORT MELVILLE, on the eastern side of Delagoa bay, is a good harbour in all winds, being sheltered by Inyack and Elephant islands and Cockburn shoal on the east, and by Gibbon and other shoals on the west, which shoals are discernible by the colour of the water. This is a safe port to come to for refitting, and far better than English river on account of the unhealthiness of the latter. A Portuguese officer with a detachment of soldiers is stationed at Black bluff, but there is no pier. Signals are made from Black bluff to Lorenzo Marques by means of the heliograph.

Elephant island, about one mile northward of Black Bluff, Inyack island, is $1\frac{1}{4}$ miles in length, but not being more than 25 feet above high water, is difficult to make out from a distance, when in line with Inyack. It is sandy, with bushes on the top, and uninhabited. Gibbon, the west point of the island, is bold, having 6 to 8 fathoms at the distance of one cable. Gibbon point is considered to be situated in lat. $25^{\circ} 58' 3''$ S., long. $32^{\circ} 54' 11''$ E.*

Supplies.—Small supplies may be obtained from the natives of Inyack, but bullocks are scarce. Water may be obtained with a little trouble. Wells should be dug 10 or 12 feet deep, about 70 yards inland on the west and highest part of the island. H.M.S. *Orestes* obtained from 6 to 8 tons a day by sinking casks in the sand. The Portuguese troops have their water brought from English river.

Directions.—Vessels proceeding to port Melville, and having followed the directions given on page 186, as far as Fawn shoal, should then steer for the white barrack or Black bluff in line with Gibbon point, bearing S. $\frac{1}{4}$ E. (view B. on plan 644), thence passing about one cable westward of Gibbon point, bring it to bear N. by E., and anchor when convenient in about 9 fathoms, sand, bearing in mind that the channel here, with a depth over 5 fathoms, is but a quarter of a mile wide. A large vessel will find more space just eastward of Gibbon shoal, and should, from a position with Gibbon point bearing E.S.E. about 2 cables, steer about S.W. by W., until the south point of Elephant island bears E.S.E., where anchorage will be found in from 8 to 10 fathoms, sand.

COAST.—North-eastward of Cutfield hummock (page 185) the coast consists of sandhills about 150 to 200 feet high, to latitude $25^{\circ} 23'$ S., a distance of 17 miles, where there is a long bare sand ridge, having four small cones, 290 feet in height, and forming a conspicuous landmark.

The sandhills increase in height between Lagoa and Limpopo rivers to 380 and 430 feet; at the west point of the latter river is a red topped sandhill, whilst at a distance of 17 miles eastward is Salmon cliff, which is red and conspicuous, and backed by cultivated and grassy hills; thence, and beyond Zavora river, the coast sand ridges are very low, and there is nothing noticeable until the remarkable orange-coloured sand hill 400 feet high, and 16 miles westward of Zavora point is approached; between this hill and the point is a peak 575 feet in height.

* See Admiralty plan:—Port Melville, No. 645; scale, $m=2$ inches. The entrance to port Melville, from survey of *Fawn*, was found to be narrower than in former years. H.M.S. *Fawn*, 1882.

Lagoa shoal is a ridge of rock and sand, 5 miles long and a quarter of a mile wide, lying parallel to, and between 4 and 5 miles distant from the shore, near the Northern approach to Delagoa bay. A least depth of $2\frac{1}{4}$ fathoms was found near the centre of the shoal, with Cutfield hummock bearing West, distant about $21\frac{1}{2}$ miles, and the bare sand ridge N.N.W. $\frac{3}{4}$ W., distant 5 miles.

Lagoa lake.—The entrance to Lagoa lake is 27 miles northward of Cutfield hummock ; its west point rises to a sandy hill 245 feet high. When near the shore the lake is easily identified by the limestone cliffs or blocks of stone, about 80 feet high, facing the sand hills, extending for some distance on either side of it, and forming a gap about 500 feet in width. It is this break in the cliff which has caused the lake to be mistaken for a river, whereas it extends back only for a distance of about 3 miles, and is but a ravine full of water, separated from the sea by a ridge 30 feet above sea level. The water in the lake was fresh and navigable by boats, but landing from seaward was not practicable. Captain Aldrich, when surveying in the neighbourhood, states that at half flood a narrow stream of water was visible communicating with the lake, but it was breaking heavily right across the entrance. The sandhills in the neighbourhood are of a red colour, differing from those about Delagoa bay.

LIMPOPO or Innampura river.—The entrance to this river, 300 yards wide, is situated about 17 miles eastward of Lagoa lake, in long. $33^{\circ} 31' E.$ The east point of entrance is a narrow sand spit about 12 feet high, but its west point has several sand hills 200 feet high ; the outer sand hill is red, and a conspicuous mark for identifying the river. Within these points there is a large basin with depths of 5 fathoms. The river has a double bar extending and breaking at times to 3 miles from the coast. There is said to be a depth of 3 feet at low water over the bar (with a rise of about 11 feet), but it is difficult to enter, and the streams run with great strength. Within the bar the river has a depth of 12 feet for about 40 miles, and is said to be navigable for light draught steamers for 60 miles. The banks are cultivated, the soil is rich, and everything develops rapidly. There is a French trading station about 4 miles above the entrance, with native agents. The Limpopo takes its rise near Pretoria, in the Transvaal Republic, and is about 1500 miles in length.

Captain F. Elton (1870) states that the Limpopo river is navigable for steam vessels of light draught, even in the dry season, between the tributaries Nuanetzi and Lipalule or Oliphant river, 100 miles

apart. The junction of the Lipalule with the Limpopo is at about 120 miles from its mouth.*

Captain Chaddock, of the steamer *Maud*, 65 feet long and 6 feet draught of water, ascended the Limpopo for purposes of trade in April, 1884, with not less than $3\frac{1}{2}$ fathoms as far as Manjoba's kraal and crossing, 80 miles from its mouth. The crossing, bars the river, and is said to have at times as little as 4 feet. Eight feet was the depth at the time of his visit, and his people stated that the river commenced to rise shortly afterwards. He states that having waited outside the bar until half flood he got nothing less than $4\frac{1}{2}$ fathoms on crossing, but there was a 4 knot stream against him. On coming out of the river 13 days later at high water, the depth was but $2\frac{1}{2}$ fathoms, which he attributes to the heavy sea and bad weather that had been prevailing for 3 days previously. (From this it may be gathered that the first account of the bar is probably not much in error.) Though he paid all dues demanded he received no protection, and eventually lost everything but his vessel. The first 12 miles of the river is wooded with mangroves, above which the country is low and level, and almost destitute of fuel, to Manjoba's kraal, whence it gradually rises to hills and mountains in the interior, and is well wooded. The Banians have a small inland trade with Manjoba's kraal or village.

COAST.—Innampura shoals, about 5 miles in length and one mile off shore, are charted between the Limpopo and Salmon cliff to the eastward, but we have no other information about them. M. Marron reports shoal water of $3\frac{1}{2}$ fathoms between the Limpopo and Lagoa lake to the westward, at 2 miles off shore, which may possibly be the correct position of the Innampura shoal, though nothing was seen here by the *Sylvia*; it is advisable, however, to give the coast, in both positions, a wide berth.

Zavora point, in lat. $24^{\circ} 28\frac{3}{4}'$ S., long. $35^{\circ} 12\frac{1}{4}'$ E., rises to a ridge of sand hills over the coast, between 200 and 300 feet high. It has no particular distinguishing feature, but at $1\frac{3}{4}$ miles northward of it is a conspicuous sand cliff, nearly half a mile in length.

About 15 miles north-eastward of Zavora point is a remarkable clump of trees, the only ones in the locality.

Reef.—At 22 miles north-eastward of the same point, a rocky reef extends nearly half a mile from the shore, and heavy breakers were seen along that part of the coast for a distance of 3 miles.

* Captain Elton was informed that the bar of the Limpopo was frequently crossed by slavers, who went a long way up the river to avoid British cruisers.

CHAPTER VI.

MOZAMBIQUE CHANNEL.

CAPE CORRIENTES TO MOZAMBIQUE HARBOUR.

(Lat. $25^{\circ} 55' S.$ to lat. $15^{\circ} S.$)

VARIATION IN 1889.

| | | | | | |
|-----------------|---|---|---|---|---------------------|
| Cape Corrientes | - | - | - | - | $21^{\circ} 15' W.$ |
| Sofala | - | - | - | - | $19^{\circ} 0' W.$ |
| Kilimán river | - | - | - | - | $16^{\circ} 45' W.$ |
| Mozambique | - | - | - | - | $14^{\circ} 0' W.$ |

CAPE CORRIENTES, the south-west extreme of Mozambique channel, is a rounded, sandy point, partially covered with bushes, and rises at the back to a height of 375 feet, while the land on either side of it is somewhat higher. The cape may be recognised by detached black rocks near it, also by an islet 15 feet high situated $2\frac{1}{2}$ miles south-west of it, and connected with the shore by a rocky reef. The islet is situated in lat. $24^{\circ} 5\frac{1}{2}' S.$, long. $35^{\circ} 29\frac{3}{4}' E.$

The coast about the cape is bold and safe to approach within one mile or less.

Current.—The current nearly always runs to the southward from one to 2 knots an hour.* H.M.S. *Sylvia*, in December, at $1\frac{1}{2}$ miles off cape Corrientes, found the current setting to the southward at the rate of 3 miles an hour; within one mile of the shore, at 6 miles to the southward, there was no current, whilst at a further distance of 8 miles to the southward and $1\frac{1}{2}$ miles off shore, there was a counter set of one mile an hour. The currents were found to be stronger off

* See Admiralty chart:—Cape Corrientes to Juba islands, including Madagascar, No. 597; and Delagoa bay to Zambesi river, No. 648; scale, $m = 0\cdot 1$ of an inch.

the cape than on any other portion of the coast, though much influenced by the winds, but they always set direct along the shore, and never on or off.

Coast.—Cape Wilberforce, at about 14 miles north-eastward of cape Corrientes, has a grassy summit 200 feet high, and is nearly clear of bush; the coast thence trends in a northerly direction, about 8 miles to Burra point, the southern extreme of Innambán bay. The coast from cape Corrientes to Innambán is composed of sand hills, from 200 to 400 feet high, having at a distance the appearance of chalky cliffs, and visible at a distance of 20 miles or more. Anchorage may be obtained in case of being becalmed, in from 15 to 20 fathoms at nearly one mile off shore, an advantage to sailing vessels proceeding northward on account of the strong southerly current which generally prevails.

INNAMBÁN BAY lies between the Burra, and Algoa point to the north-westward, a distance of 9 miles. A line of breaking reefs, dry in places at low water, extends nearly the whole of this distance from the Burra, completely blocking the bay. Innambán river enters the sea westward of this reef, and abreast Algoa point.*

Barrow hill, on the south point of Innambán bay, is 230 feet high. From the northward the hill is readily recognised, rising to a sharp summit having a wooded clump on it.

Its position is lat. $23^{\circ} 45' 30''$ S., long. $35^{\circ} 31' 41''$ E.

Landmarks.—The Pedestal, a large white triangular mark situated on the shore of Lingalinga peninsula, is conspicuous from seaward only in the forenoon, and is a leading mark over the bar.

The Pillar, on the ridge of hills forming the west side of the harbour, is easily distinguished from the northward.

Conspicuous tree, formerly named South tree, is remarkable only when seen from the northward, or with the pedestal bearing southward of W. $\frac{1}{2}$ S., it then shows as a large bush, having the summit of a hill a little higher just south of it.

The Burra, on which stands a lighthouse, is about one mile eastward of Barrow hill; a rocky reef extends 4 cables north-eastward of the lighthouse, and other patches lying the same distance off shore, are situated about one mile north-west of it.

LIGHT.—From the lighthouse is exhibited at an elevation of 80 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 14 miles.

* See Admiralty plan :—Innambán river, No. 650 ; scale, $m = 1\cdot65$ inch ; surveyed by H.M.S. *Sylvia*, 1884.

The lighthouse is a white square tower, surmounted by an iron scaffolding, and near it is a flagstaff from which signals are made through another signal station on Ilha dos Porcos, to the town of Innambán.

Pilots.—Signals.—Vessels passing or anchoring are signalled, and if requiring a pilot, the usual pilot-jack should be hoisted, and the ship anchored off the channel across the bar, or keep underway between the Burra and the river. The pilot boats always come out across the bar, and are in the employ of the Government. Pilots may be obtained here for other places on the coast.

Anchorage.—There is good anchorage in about 8 fathoms, half a mile off the bar, with the lighthouse bearing S. $\frac{1}{2}$ W., and the Pedestal W. by S. In strong southerly winds good shelter may be found under the lee of Barrow hill, about three-quarters of a mile from the shore; there is also good anchorage, over sandy bottom, anywhere between these positions at about one mile off the reef. There is nearly always a swell at the outer anchorage.

At night it may be advisable to keep off and on to the northward of the bar, making due allowance for the current which sets strong to the southward.

INNAMBAN RIVER.—Although the entrance to this river is spacious and forms an excellent harbour for vessels of moderate draught, the river is scarcely navigable for a vessel beyond the town, and but a short distance further for boats. The channel from the bar to the town of Innambán is $14\frac{1}{2}$ miles long, and in no place is it more than one mile wide; just inside the bar it is $3\frac{1}{2}$ cables, and off the town $2\frac{1}{2}$ cables wide. Many banks dry at low water, and the channel is usually marked by six red buoys, but four of these were missing in 1888.

Mafarun islet.—A sand patch 3 feet above high water on the west extreme of the reef stretching northward from Barrow point, is a small but useful mark when near the middle ground abreast it; formerly it was much larger. It lies $3\frac{1}{4}$ miles S. by W. $\frac{1}{4}$ W. of the Pedestal bar mark; about half a mile south of it is a boat channel to Barrow point.

Ilha dos Porcos is low and flat, with cocoa-nut trees about 90 feet high, and lies about $1\frac{1}{2}$ miles southward of Mafarun islet. On the south-east extreme is the signal station for transmitting signals from Burra lighthouse to Innambán. Ilha dos Ratos is similar in appearance.

Shikoki point, on the west side of the harbour, is a remarkable sand cliff, used as a leading mark to the anchorage off the town. Rather more than one mile south of these cliffs is the large village named Obra, with a flagstaff on the beach.

The Bar is about 4 miles from the shore, and according to the survey by H.M.S. *Sylvia* in 1884, a stranger could not depend upon more than 9 feet water at low water springs on the line of the leading mark. In 1888, the bank on the south side of entrance was stated to have extended to the northward.

There is a heavy sea on the bar during southerly winds, at times rendering it unsafe even for boats, but they may generally cross safely by keeping in mid-channel.*

Tides.—It is high water, full and change, at Innambán at 5h. 38m.; springs rise 1.1 feet, neaps 7 feet. The tide runs strong in the river; off the town it sometimes amounts to 4 knots an hour.

Directions.—To cross the bar, steer in with the double bush just open northward of the Pedestal bearing W. by S. $\frac{1}{2}$ S. This mark will lead northward of the first red buoy and up to the Pedestal, off which a vessel may anchor and wait for a pilot.† If proceeding without the assistance of a pilot, steer on the leading mark above, and when No. 3 red buoy is abeam, alter course to S.W. $\frac{1}{2}$ S. until Conspicuous tree is in line with Lingalinga point; thence steer to pass No. 4 buoy close-to on the port hand.

After passing No. 4 buoy keep No. 5 buoy about a point on the starboard bow until within 2 cables of it, and then steer to pass both Nos. 5 and 6 buoy close to on the port hand; thence steer a course S.W. $\frac{1}{2}$ W. until the north extreme of Ilha dos Ratos is in line with Barrow hill bearing E. $\frac{3}{4}$ S., and the summit near Conspicuous tree is in line with the west extreme of Shikoki cliffs bearing N. $\frac{3}{4}$ E.; this latter mark, kept astern leads up to the anchorage off the town.

The holding ground here is good, but it is advisable to moor if intending to remain.

Innambán town is situated on the east entrance point of the river, but being surrounded with cocoa-nut trees is not easily seen until

* The bar frequently shifts and moves north or south, according to the winds. A strong S.E. gale will, it is said, alter the bar considerably. The leading marks therefore are not always to be depended upon. H.M.S. *Fawn*, 1884.

† Too much dependence must not be placed in the buoys maintaining their charted positions, more especially the bar buoy. The bar leading mark is for the year 1888. In 1884, the pedestal had to be kept between the double bush and summit. (See sketch on chart.)

close to. There are no good public buildings to attract attention, and the streets are ill paved.

The small fort, here, has a garrison consisting of native soldiers.

Pier.—There is a wooden pier, but it does not quite reach to low water.

Population.—In 1884, there were 54 Europeans in Innambán, including two American missionaries; native population not known.

Climate.--From November to May, fevers are especially to be guarded against; Innambán is considered to be the most healthy of the Portuguese possessions hereabouts.

Communication.—See page 8.

Supplies of cattle, poultry, fruit, and vegetables, are readily obtained at the town, and small supplies of good water may be got by rolling casks up to the wells in the town. Oranges and lemons are in abundance. Firewood is cut and brought in boats from Barrow point by the natives, through the numerous channels in the reef.

The Products are ground nuts, gingelly seeds, copal, beeswax, and rubber; occasionally tiger skins and elephant tusks are brought in. The imports are much in excess of the exports. Most of the trade is in the hands of the Banians, and the loading is done by native women, who wade off to the lighters with the bags of produce on their heads.

Linga-Linga bay is the mouth of the north branch of Innambán river; it forms a fine landlocked harbour for small vessels, having a depth of 2 fathoms or more at low water, and has doubtless been used by slavers to escape the observation of passing cruisers.

COAST.—From Innambán to Burra Falsa (cape Lady Grey), a distance of 50 miles, the coast has no remarkable feature, except Sylvia ridge, 10 miles southward of Burra Falsa. This ridge of bare sand of a reddish colour is 330 feet high, and has upon its southern end a conspicuous solitary tree, somewhat resembling a tower. Between it and Innambán the coast range is from 400 to 600 feet high.

Sylvia shoal is a narrow coral ridge, with $2\frac{1}{2}$ fathoms least water; within the depth of 5 fathoms it is about $4\frac{1}{2}$ miles long, parallel to the shore and distant $3\frac{1}{2}$ miles from it.

From the north end of the shoal, Burra Falsa bears N.N.E. $\frac{1}{2}$ E., distant $9\frac{3}{4}$ miles.

Current.—A strong southerly current is generally met with round Burra Falsa under one mile distant from it. When bound northward

and clear of Zambia shoal, the current is much less inshore in depths of from 7 to 8 fathoms, and at times sets to the northward.

BURRA FALSA, or cape Lady Grey, in lat. $22^{\circ} 55' S.$, long. $35^{\circ} 37' E.$, is a low point, and rises to two small conical sand hills about 95 feet high. To the southward the land rises to 365 feet above the sea.

There is much sand about the high land over the cape, making it conspicuous from the northward. Good shelter may be obtained under the cape during southerly winds, and landing might be effected at times just north-west of it.

Pumene river, situated $3\frac{1}{2}$ miles north-west of Burra Falsa, was seen from the *Sylvia* at high-water neap tides, when there was apparently a narrow boat channel into it. Inside, the river opened to a large expanse of water.

Shivala cliffs, situated 12 miles northward of Burra Falsa, are nearly two miles long, about 120 feet high, and red coloured, forming a conspicuous landmark.

Zambia shoal, upon which the British ship *Zambia* struck, is a coral ridge, rather more than one mile long by half a mile wide; from the shoalest part in 3 fathoms, Burra Falsa bears S. by W., distant $9\frac{1}{2}$ miles, and the highest part of Shivala cliffs S.W. $\frac{2}{3}$ W. The water deepens rapidly to seaward of the shoal.

Dangerous ground.—At 26 miles northward of Shivala cliffs a depth of 3 fathoms was found one mile off shore, apparently part of a reef extending from the land, vessels should give this locality a good berth, and not approach the shore within 2 miles.*

CAPE ST. SEBASTIAN, in lat. $22^{\circ} 5\frac{1}{2}' S.$, long. $35^{\circ} 28\frac{3}{4}' E.$, is a steep bluff 225 feet high; from the southward, a small white sand patch shows at the upper part of the bluff, while from the northward the face of the cliff shows a considerable amount of red sand from base to summit. The coast hills terminate at 7 miles south of cape St. Sebastian; here a sandy spit begins, partially covered with straggling trees and bushes, and extending in a northerly direction for 6 miles, to nearly abreast the cape.

The spit is about half a mile across, having shallow water westward of it, and bounded by the high land forming the cape.

The BAZARUTO ISLANDS extend along the coast for a distance of more than 30 miles northward of cape St. Sebastian.

* See Admiralty chart:—Delagoa bay to river Zambesi, No. 648; scale, $\frac{1}{2}=0.1$ of an inch.

These islands are under the jurisdiction of the Governor of Chiluán ; a few Portuguese troops are stationed upon them, and the small produce is conveyed by boats to Chiluán for shipment. The principal establishment is on Marsha island. They are five in number, viz. :— Bazaruto, Benguerua, Xegine, Bango, and Marsha or St. Carolina ; the first four of which form the east side of Bazaruto bay. There does not appear to be any passage between the islands, except probably boat channels.

This is the site of the famous pearl fishery of Sofala ; pearls and mother-of-pearls are met with occasionally, but there is little trade at the present time (1884).

Bazaruto island, the northern and largest of the group, is $17\frac{1}{2}$ miles long, and from the southward appears as a hog-back of bare sand, the highest part of 390 feet is near the north entrance. There are several villages on the island.

Cape Bazaruto is the northern extreme of the island ; the pitch of the cape is fronted by a reef to the distance of half a mile, whilst a sand spit covered at high water, and steep-to, extends about $1\frac{1}{2}$ miles north-westward of its low extreme.

Anchorage was obtained by the *Sylvia* on the north-east side of the spit, sheltered from southerly winds. Probably there are better anchoring places, but the ground westward of the Bazaruto islands was not examined.

The depths northward of cape Bazaruto are irregular, and the bottom rocky and uneven, with strong tide rips ; but no spot appears to have been found with less than 5 fathoms. The bottom in some places is sandy.

Benguerua island, sandy and partly wooded, lies southward of Bazaruto island, and is 170 feet in height. Off the south point a sand spit dries out $1\frac{1}{2}$ miles, and from the northern end a sandy spit dries for 3 miles, having a small islet upon it, and a rocky reef eastward of the spit.

In 1857, there were 5 villages and 260 inhabitants, including a detachment of soldiers. There is said to be anchorage in 3 fathoms near the shore, on the south-east side of the island ;* we have no information or any passage leading to it, except, that between Bazaruto and Benguerua there is a break in the reef, which under favourable circumstances might be available for boats.

* Statistics of Portuguese Possessions, 1859. Description of islands by Captain Aldrich, H.M.S. *Fawn*, 1884.

Xegine island lies southward of Benguereia island, and may be recognised by some red cliffs about the southern part, the remainder being wooded down to the water's edge. It is 175 feet in height and has but few inhabitants.

Bango island, nearly 4 miles north of Cape St. Sebastian, is low and sandy, and has a dark clump of trees near its centre; reefs and foul ground extend 4½ miles seaward of it.

Marsha or St. Carolina island, in the middle of Bazaruto bay, has a commandant and a small detachment of soldiers, and is the principal establishment of the Portuguese between Innambán and Sofala. Marsha is low, with a low sand hill on its north-east side, but well wooded and easily made out. On a vessel's approach, the Portuguese flag is hoisted, near the centre of the island. There are two good wells of water on the island, but none to spare for shipping. There is also good building stone.

Bazaruto or Punga bay, appears to have been but little examined at the time of Owen's survey. The anchorage between Marsha and Bazaruto is good, in 4 fathoms, sand and stones; a ledge of rocks, which uncovers at low water springs, divides this anchorage from another channel nearer the shore, where from 6 to 8 fathoms will be found.

The entrance is from the northward, a little nearer to Bazaruto island than to the mainland opposite. There is anchorage also to the southward of Marsha island in 5 to 7 fathoms.

Tides.—It is high water at cape Bazaruto, full and change, at about 4h. 10m., and the rise at springs about 12 feet.

COAST.—From cape Bazaruto northward to Machanga point, a distance of 39 miles, the coast, known as the Buok coast, is little known or frequented; but the soundings appear to decrease gradually towards it. Northward of Machanga point, to beyond Chiluán, shoals extend to a distance of 10 miles off-shore.

Govuro river empties itself in to Moromone bay, 14 miles southward of Machanga point. It is hardly navigable for boats at its entrance, but is reported to become a fine river in the interior.

Sabi river enters the sea both northward and southward of Machanga point by several shallow mouths. The river is said to be one mile broad in the interior, but not navigable.

SHOALS.—Machanga point, at 16 miles S. by E. from Ingomaimo point, is low, with some small sand hillocks just northward of it. The coast between the above points is fronted by shallow

ridges, extending 9 miles seaward, from which distance it is only just visible, so that great care and attention to the lead is necessary when approaching this dangerous locality.*

Misadjuana shoal, also known as Inverarity shoal, lies 10 miles E.S.E. from Chiluán island; it is 3 miles long, and nearly dry in one part at low water. From the shoal no distinguishable landmarks can be seen, but heavy breakers usually mark its position.

CHILUÁN ISLAND, situated at, and lying partly in the mouth of Ingomaimo river, is about 6 miles in length, by 3 miles in breadth; it is low, and in many places nothing more than a mangrove swamp, intersected by a creek navigable for boats at high water. The principal village and residence of the governor (Portuguese) is upon the south side, where there is a small fort and a flagstaff.*

The northern channel of the Ingomaimo, named Singune (Chingani), is the one used by vessels visiting Chiluán, and has from 22 to 28 feet at high water as far as the anchorage. The southern channel, named the Inhabacara, has nearly as much water as far as the southern town, but is narrow and intricate.

Supplies.—Goats, fowls, and eggs can be obtained in small numbers, but no vegetables can be bought. The mail steamer calls at Chiluán monthly; *see page 8*.

Population.—Trade.—In 1884 the population of Chiluán amounted to 1,200. The exports, consisting chiefly of india-rubber, ground nuts, and gum, were valued at £30,600 in 1883, and the imports, consisting chiefly of cotton goods and hardware, at £17,400.

Ingomaimo point, $2\frac{1}{2}$ miles south-east of Chiluán island, is low and sandy, with no mangroves, thus differing from other points in the vicinity.

A beacon, consisting of a high pole, surmounted by black and white diamonds, is erected on the point.

Inhaguaiá point shows as a bluff from the northward, and is useful for ascertaining the position of a vessel when approaching Chiluán anchorage.

Shoals in the Approach.—Misadjuana shoal, and the shoals lying between it and Machanga point, have been already referred to.

South breakwater is an extensive bank fronting the south channel, and lying $3\frac{1}{2}$ miles eastward of Ingomaimo beacon. Anson knoll, near the southern end of the bank, has 9 feet water, and Richardson knoll, near the north end, has $1\frac{1}{2}$ feet over it.

* Captain P. Aldrich, H.M. surveying vessel *Sylvia*, 1884. *See Admiralty plan:—Chiluán island and approaches, No. 921, scale, m = 1 inch.*

The extensive shoal which fronts Chiluán island to the distance of about $1\frac{1}{2}$ miles, extends to within one mile of the south breakwater, or about $3\frac{1}{4}$ miles from Inhaguia point, the south-east extreme of the island.

North breakwater is a similar bank to south breakwater ; it lies $4\frac{1}{2}$ miles E.N.E. from the lighthouse on Singune point, and fronts the north channel ; the tide here sets strongly across the channel.

LIGHT.—The lighthouse stands on Singune point, the north-west extreme of the island ; it consists of a white tower surmounted by an iron ladder, from the top of which, at an elevation of 36 feet, is exhibited a *fixed* white light, said to be visible in clear weather from a distance of 10 miles ; but being an ordinary ship's lantern, is probably not visible more than 5 miles.

Position :—lat. $20^{\circ} 37' 12''$ S., long. $34^{\circ} 53' 33''$ E.

There is a flagstaff near the lighthouse, and also a white house, which is visible for some distance.

Pilot.—There is only one pilot, who resides at the south village, and is not readily obtained. It is customary to bring a pilot from Innambán.

Tides.—It is high water, full and change, at Chiluán, at 4h. 49m. ; springs rise $18\frac{1}{2}$ feet, neaps 13 feet. The streams run from 3 to 4 knots in the channels, and in north channel set across the vessel's course between North breakwater and the island.

Directions.—Anchorage.—From the southward, Chiluán island presents no recognizable features, and is not in sight from Misadjuana shoal, which is steep-to, but except at high water and fine weather, it will be seen by the breakers. From the northward, a few cocoa-nut trees are remarkable on the north-west part, being the only ones in the vicinity ; also a large clump of trees about $1\frac{1}{2}$ miles south-east of the lighthouse, but these objects do not appear to be visible much beyond the North breakwater shoal. The north channel is that generally used, but as the banks are liable to shift it is advisable to employ a pilot.

The following directions applied to North channel, when surveyed in 1884.

Approach Singune point lighthouse bearing W. $\frac{1}{4}$ N. until Inhaguia point bears S. $\frac{1}{2}$ W., when alter course to N.W. $\frac{1}{2}$ N. until the lighthouse bears W. by S. (observing that the tidal stream sets across the channel). The course should now be W. by N. $\frac{1}{4}$ N. until the lighthouse bears S.W., after which it may be kept a little on the port bow until the anchorage is reached, when anchor in 4 fathoms, with the lighthouse bearing about S.E., distant a quarter of a mile. All

cargo is shipped and discharged from just within this position. South channel should not be used unless buoyed.

The channel between Chiluán and the main land is navigable for vessels of 14 feet draught at high water, in charge of a pilot; so that vessels can proceed to the town if necessary, off which there is anchorage in 4 to 5 fathoms.

BOENE is a small, well-wooded, uninhabited island, about 21 miles northward from Chiluán, and about 12 miles southward of Sofala, at the mouth of the Gorongosi river. It affords a good shelter for small vessels.* There is a grove of palm trees on the island.

SOFALA BANK.—Sofala is situated at the head of the extensive and comparatively shallow bight lying between cape Bazarute and the Zambesi, a distance of about 170 miles. From Sofala eastward the depths appear to increase very gradually, there being 30 fathoms only at the distance of 70 miles. Within the 100-fathom line this bank, known as Sofala bank, apparently follows the contour of the coast, but its actual limits are not known. Inshore, at the mouths of many of the rivers, the bottom is muddy, but the general soundings are fine sand, which becomes coarser as the distance from the land is increased, and is very coarse near the outer edge, where it deepens suddenly.

SOFALA.—The town and fort of Sofala are situated on a small sandy peninsula on the north side of the entrance of the river, in about lat. $20^{\circ} 11' S.$ Shallow flats with three fathoms and less water, extend about 7 miles off the entrance, with depths of 5 fathoms at 9 miles distant. Vessels should approach cautiously by the lead, and little dependence must be placed on the chart.†

The land about Sofala is all low, with scarcely any trees, but immediately in the vicinity of the river the land is a little higher and more irregular, with scattered tall trees; three of these, near the fort, are remarkable high cocoa-nut trees, and are seen from some distance, and before the fort is sighted.

Anchorage.—H.M. Brig *Helena* (1844) anchored in $6\frac{1}{2}$ fathoms, sand, with the fort bearing N.N.W. 7 or 8 miles. This was the best anchorage for strangers, but in working out to sea the depths were found to be very irregular, shoaling suddenly at times from 10 to 5 fathoms, then immediately deepening, which is suggestive of great caution being required, considering the rise and fall of tide is 19 feet.

* See Admiralty chart:—Delagoa bay to river Zambesi, No. 648; scale, $m=0.1$ of an inch.

† See plan of Sofala river on Admiralty chart, No. 648; scale, $m=1.0$ inch.

Sofala river is about $1\frac{1}{2}$ miles wide at the entrance ; the south side is formed by the island of Inhancata, separated from the main by a narrow boat channel. The river, although so wide, is almost blocked up by sand banks which dry at low water.

Bar.—The depth on the bar appears by the chart to be 9 feet at low water. There were two channels divided by a long narrow shoal dry at low water, but in 1859 the northern channel was blocked up. On the southern side of the channel the Matus Grossa sand projects about 3 miles, and at low water springs is dry almost to that extent.* This bar should not be attempted by any but small vessels unless the channel be previously examined and buoyed.

Tides.—It is high water, full and change, at 4h. 0m. ; springs rise 19 feet.

The Town, which is built at the mouth of the river, is divided into two portions, one of which contains the governor and his subordinates and their slaves. The total population of Sofala in 1858 was 2,019, of which number 266 were Christians, and 96 Moors. A short distance to the northward of the fort is a church. The fort, which is old and dilapidated, is garrisoned by about 80 half-caste Portuguese.

Water.—There is a great want of water in the town, but it might be easily supplied from a pure stream about a mile distant. There is, however, a large cistern in the fort.

Products.—Sofala is said to have been in olden times the Ophir of Solomon, whence his fleets returned laden with "gold, almug trees, and precious stones ;" it presents, however, no trace of former opulence, but merely a paltry fort and a few miserable mud huts. The trade is insignificant ; a small quantity of ivory, beeswax, and ground nuts is sent to Mozambique.

MASSANZANI BAY.—From Sofala the coast takes a northerly direction to the Pungue river, situated at the head of the bight formerly known as Massanzani bay. This coast should not be approached under 6 fathoms water, or within the distance of 8 miles, as the water is shallow to about that distance ; the land is very low.

PUNGUE RIVER is nearly 4 miles wide at its entrance. It is fronted by a bar to the distance of 7 miles, over which there appears to be a depth of 3 feet at low water, or 19 feet at high water springs. Within the bar there is apparently anchorage in from 4 to 5 fathoms between Chieve and Massigue points at the mouth of the river. The

* Captain Vidal, R.N., 1828.

town of Bangue is situated about 2 miles within the north point of entrance ; here the ground rises, and being covered with large trees is seen from some distance. The river appears to be navigable by small craft for many miles.*

COAST.—From Maguti point, Pungue river, to a small river in lat. $19^{\circ} 29'$ S., a distance of 37 miles, the coast is slightly elevated, and bounded by a range of low sand hills, which, at about midway, are remarkable, being thrown up to the height of 200 feet, in a number of sharp pointed hills resembling pyramids ; these are conspicuous by being almost devoid of vegetation, whilst a thick jungle prevails around. From the river mentioned in lat. $19^{\circ} 29'$ S. to West Luabo river the land is lower than that to the south-westward. Several small rivers run into the sea along this coast.

The ZAMBESI DELTA† may be said to comprise the West Luabo, Melambe, Inhamissengo (Kongoni), East Luabo, and the Muselo ; the West Luabo, however, is not a branch of the Zambesi. The land forming the mouths of these rivers is low, nowhere exceeding from 50 to 80 feet high, and the similarity of the appearance of the different rivers renders it difficult to distinguish them.

The Zambesi, or East Luabo entrance, forms a large opening between two comparatively lofty and densely wooded points ; the trees on Bluff point (*see* sketch on plan) are remarkable, the light showing between their straight bare trunks give them a resemblance to cliffs when seen from a distance. The Inhamissengo may be identified by its lighthouse, beacon, and flagstaff on the West point, but strangers are recommended to identify the East Luabo entrance before proceeding to the Inhamissengo, unless absolutely certain of the position of the vessel. The Inhamissengo, page 210, is the best entrance to the Zambesi ; it had from 15 to 18 feet over the bar at high water springs in 1888. For inland navigation, *see* page 214.

The lead is of much assistance when making this part of the coast, the soundings decreasing from 20 fathoms at 25 miles to 7 fathoms at 4 miles distant, from which depth the soundings still decrease regularly to the bars of the rivers without any known outlying dangers except the Elephant shoal, which may be considered as the bar of the Zambesi.

* *See* plan of Pungue river on Admiralty chart, No. 648 ; scale, $m = 0\cdot65$ of an inch. Information given above is gathered from the chart, from a rough survey made in 1885.

† *See* Admiralty plan :—Mouths of the river Zambesi, with view. No. 2,865 ; scale, $m = 1$ inch.

Caution.—The various directions which from time to time are given for crossing the dangerous bars of the Zambesi delta, shortly become obsolete and should therefore be used with the utmost caution. The large body of water which runs out of the different branches during the rainy season, and the continued heavy ocean swell, so alter the position of the several bars, the banks, direction and depths of the channels, and even cause islands to form and wash away, that no special directions of any permanent value can be given. During the southerly monsoon period, the dry season, the bars are most dangerous; the wind blows then directly on shore. There is a Government pilot at the Kongoni.

WEST LUABO (Luana) RIVER.—At Ord point, the eastern side of entrance to this river, the trees commence and thickly clothe the eastern bank. Kirk point, the western point of entrance, is distant $1\frac{1}{2}$ miles. This river may be known by a range of hummocks on its eastern side, and very low land to the south-westward. The West Luabo has frequently been taken for one of the mouths of the Zambesi, but it has been ascertained to have no communication with that river, unless it be by small creeks. It pursues a zig-zag course for about 20 miles with not less than 2 fathoms in the channel, above which it does not appear to have been sounded. Thornton river runs into the West Luabo from the westward, at about 25 miles from its mouth.

The Bar extends more than 2 miles from the shore, with from 3 to 6 feet at low water, and 16 or 17 feet at high water springs. To enter the river observe a quoin-shaped clump of trees about $1\frac{1}{4}$ miles inside the western point of entrance. Bring this clump to bear about N. by W. $\frac{1}{2}$ W., which will lead over the bar in the deepest water. When within the bar keep near the western breakers, as the deepest water is found on that side; and when well within the western point of entrance, steer over towards the eastern point.*

Tides.—It is high water, full and change, at 4h. 30m.; springs rise from 12 to 15 feet. The streams of ebb and flood run regularly in the river from $1\frac{1}{2}$ to 2 knots.

MELAMBE RIVER lies 6 miles eastward of the West Luabo, and $3\frac{1}{2}$ miles westward of the Kongoni, of which river it is the western mouth. It is reported to have been the chief place of resort in former times for vessels engaged in the slave trade, but its mouth appears to be choked with sand-banks; it has not, however, been sounded.*

INHAMISSENGO (KONGONI) RIVER is about midway between West Luabo and East Luabo mouths, and has from 2 to 5 feet over its bar at low water springs. It extends about 15 miles

* F. Skead, Master, R.N., 1861. See Caution, above.

in a not very winding course to the northward, with depths of from 2 to 5 fathoms; it then divides into two branches, the eastern, which is the navigable one, is a creek about 30 yards wide, and about 3 miles long, at which distance it connects with the Zambesi; it is said to have a depth of 2 fathoms at low water.* The western branch is named the Doto, but apparently is not used.

It was by the eastern branch that the expedition under Dr. Livingstone entered the Zambesi, and the observation of all those who have examined these rivers led to the conclusion that the best method of entering the Zambesi was by the Inhamissengo (Kongoni). Were it not for the connection with the Zambesi, it would not be of any importance. There is a boat channel, named the Inhangurué, within the bar which communicates with the East Luabo 3 or 4 miles from its mouth, but at times this channel is blocked up.† See inland navigation on page 214.

Town.—The town or settlement, created in 1881, is situated at the south-east corner of Inhamissengo island; the buildings are of wood and well arranged, but being situated on low land, on which the river is encroaching. The town is connected by telegraph with Conceicao, 13 miles up the river.

At Inhamissengo there is a military commandant with a detachment of soldiers, and several European trading factories.

Mails.—The East African Company it was stated intended their steamers to call monthly, but no arrangement has yet been come to.

There is probably constant communication with Kilimán, from which port all the produce of the Zambesi is shipped.

Light.—A fixed red light is exhibited from a lighthouse, painted white, on the western side of the entrance to the Inhamissengo, at an elevation of 85 feet; it is intended to be visible from or beyond the outer anchorage, but it must not be depended on.

Beacon.—A mast beacon, 30 feet high, surmounted by a triangle, stands in front of the lighthouse, and S. by E. † E. about 200 yards from the flagstaff.

Buoys.—A bar buoy usually lies just within the bar in 9 feet water; a second buoy in 16 feet marks the west extreme of the spits extending from Inhangurué island nearly across the channel; these buoys must not be depended on. The channel is westward of the buoys.

Pilot.—There is a government pilot for the bar.

* F. Skead, Master, R.N., 1861. See Caution, page 210.

† See enlarged plan of Inhamissengo entrance, on Admiralty chart, No. 2,865.

Directions.—Vessels proceeding to the anchorage off the Inhamissengo, should make the Zambezi first, unless certain of their position, as its entrance is more easily discernible from its much greater breadth. Having made that mouth, steer to the westward along the coast, keeping in 4 or 5 fathoms, until the beacon, lighthouse, or flagstaff bearing the Portuguese flag on the west point of entrance of the Inhamissengo, are seen.

Anchorage.—The most convenient anchorage for communicating with the shore, is with the gap in the land bearing about North, in about $4\frac{1}{2}$ fathoms, sand; but except in fine weather vessels should lie farther out, say in 7 fathoms at 4 or 5 miles from shore. The current generally sets to the westward, causing vessels at anchor to lie broad-side to the usual S.E. wind, and consequently to roll a good deal.

Bar Directions.—Steam vessels drawing 15 feet water might possibly enter the Inhamissengo under favourable circumstances at spring tides, but 12 feet is the greatest draught known to have passed the bar. Sand-banks extend $1\frac{1}{2}$ miles off the entrance to the river, at which distance they are connected by a bar less than 2 cables across, with from 2 to 5 feet at low water (1888) and 15 to 18 feet at high water springs, on the line of the flagstaff, lighthouse, and beacon, bearing N. by W. $\frac{1}{4}$ W.* Within the bar the channel deepens. Pass the west point of entrance at the distance of one cable, and anchor off the settlement in about $3\frac{1}{2}$ fathoms. The tide runs with great strength here during the freshets. In crossing the bar a probable westerly set must be guarded against, but a vessel should not enter without the assistance of the pilot, as the bar is subject to considerable alteration. At low water the surf breaks right across the bar, and the entrance cannot be distinguished.

Tides.—It is high water, full and change, at 4h. 30m.; springs rise from 12 to 15 feet. The ebb tide at springs runs strongly, 4 to $4\frac{1}{2}$ knots at the river's mouth, and at low tide the river water is generally fresh. During the rainy season, October to February, the river often overflows its banks, rising at times 2 feet above the level of portions of the surrounding country.

EAST LUABO, known also as the Zambezi or Katrina, is the main outlet of the great Zambezi river. First Bluff point, on the western side of entrance, is so called from its high straight trees standing very close together; Hyde Parker point, on the east side of entrance is distant $1\frac{1}{4}$ miles from it.

* The least depth on the bar was 2 feet, in October 1888, at the end of the dry season; the greatest depth will probably be found between January and April.

Bar.—The shallow water around the mouth of the East Luabo extends in a southerly direction nearly 4 miles from the entrance. The sand-bank from the east point extends nearly across the mouth of the river, leaving a passage about a quarter of a mile wide between it and the bank on the western side. The sea at low water breaks completely across the passage, at which time a great portion of the banks are uncovered. In the month of June two days have been occupied without finding a practicable channel across the bar, which is said to be impracticable during the south-west monsoon or dry season.* The depth on the bar at low water springs is at times about 4 feet.† Discoloured water is seen a considerable distance off shore.

The influence of the tides is felt at 25 or 30 miles up the river ; above this distance the stream in the dry season runs from $1\frac{1}{2}$ to $2\frac{1}{2}$ knots, but much stronger in the rainy season. The river water is fresh down to the bar with the ebb tide, and in the rainy season it is fresh at the surface outside.

Commander Hyde Parker, R.N., who ascended this mouth of the Zambesi in the boats of H.M.S. *Pantaloons*, October 1849, remarks, as follows :—

At about 2 miles above First Bluff point is an island ; the main passage is on its eastern side ; westward of this island a boat channel branches off and joins the Inhamissengo. In the rainy season the river frequently overflows its banks at springs, but the waters do not remain up more than three or four days at a time. The huts on the banks of the river are built on piles, and at these times the only communication is in canoes. The first village is about 8 miles up the river on the western bank, and is opposite the fork where the Muselo, the eastern mouth of the Zambesi, separates from the main stream. This village is extensive, and there is a large quantity of land in cultivation around it. Beans of different sorts, rice, and pumpkins are the principal products, also wild cotton apparently of good quality.

The banks of the East Luabo for the first 30 miles are generally thickly clothed with trees, with occasional open glades, and many villages. At one village, about 17 miles up, on the eastern bank, a quantity of excellent vegetables are cultivated ; it is surrounded with plantations of banana and plantain trees. Above this, there are not many inhabitants on the western bank, although it is the higher of the two, and abounds in cocoa-nut palms, whilst the eastern bank is sandy and barren. The banks of the river continue mostly sandy, with few

* J. A. R. Petch, Master, R.N., 1860.

† R. Cooke, Master, R.N., 1859.

trees until within 20 miles of Maruru ; here is the large plantation of Nyangue, and the country is more populous and better cultivated.

At 3 miles above Maruru is the village of Mesan, close to which is the entrance to Mutu creek, which communicates with Kilimán river when the river is in full flood, but is dry at other times. In October the bed of the creek was 30 or 40 yards wide, and at least 16 or 17 feet above the level of the Zambesi. The rise of the river here in the rains must be nearly 30 feet by the marks on the banks. The mouth of the creek is also known as the Boca do Rio, and is about 70 or 80 miles distant from the mouth of the East Luabo. The voyage up the river to this point, occupied seven days, but only two and a half to return. *See* Inland Navigation, below.

Muselo river, the eastern outlet of the Zambesi, has some sandy cliffs on its north-east side ; it branches off from the East Luabo, about 7 miles from the mouth of that river, and runs into the sea between 8 and 9 miles eastward of it. This outlet is impracticable, even for boats in ordinary weather, the depth of water on the bar at $3\frac{1}{2}$ miles from shore being from 3 to 4 feet, with a heavy surf on the only spot where a channel appeared probable. Inside the bar, the depths vary from $1\frac{1}{2}$ to 5 fathoms to the junction with the East Luabo.

INLAND NAVIGATION*.—The Zambesi is by far the largest river on the east coast of Africa, being navigable by steam launches, of 3 feet draught, at all times of the year as far as the Kebrabasa rapids, 320 miles from its mouth, or about 20 miles above Tete, one of the principal Portuguese settlements. Powerful steam vessels of less than 10 feet draught might reach Tete during the months of January to March, when the river is in flood, but probably not without grounding ; after this the river falls rapidly. The current at this season is from 3 to 5 knots, and more in the Lupata gorge, where, even in the dry season native boats have to be tracked through. Navigation is easier for steam launches in the dry season, when the current is probably not more than $1\frac{1}{2}$ knots, and at which time there appears to be a least depth of about 5 feet over the numerous and shifting bars formed by the floods ; but this is the most unhealthy season, especially the months of April and May, when the powerful sun acting on the banks which are being uncovered, and on decaying vegetation, cause the most deadly miasma. The distances of various places on the river are given on page 217.

Depths.—The best entrance to the Zambesi is over the bar of the

* *See* Admiralty chart:—Delagoa bay to Cape Guardafui (Ras Asir), No. 597 ; and river Zambesi to Mozambique, No. 1810.

Inhamissengo or Kongoni (page 210). The southern branch of the Inhamissengo leads into the Zambesi through a narrow channel or canal only about 30 yards wide, but it is reported to have a depth of 12 feet. The Zambesi has depths varying from 3 feet and upwards in the dry season over the bars in the river left by the preceding floods from the upper river, with deeper water in the reaches between them ; these bars are ever shifting, and the depths in the river are never two seasons alike, so that no directions can be given, beyond avoiding all points and keeping in the bends, as in all river navigation.

In the wet season the river appears to have depths of from 15 to 30 feet or more. The rise in the river caused by the rains in the interior, is apparently about 20 feet ; the natives of Tete state that about every fourth year the rise is about 30 feet ; in the gorges the rise much exceeds this. The first rise takes place in November, when the lesser rains begin ; it then rises a few feet, but falls again, there being partial droughts in December. The great rise begins in January, and continues rising until perhaps the middle of March, after which it begins to fall rapidly, and the river is low again about June.

Climate.—As before stated, the river is most unhealthy during the months of April and May, when the action of the sun on banks uncovering and decaying vegetation is most active. The heat is great in February and March. The maximum at Tete in February was 103° on board the *Pioneer* ; farther down it was 97° by day in the shade and 80° at night, in the same months. Mosquitos are a terrible plague. The rainfall at Tete is about 36 inches. See also p. 20.

Settlements.—The delta of the Zambesi is thickly wooded but sparsely inhabited, as large portions of it are under water during the floods, but villages are met with occasionally on the higher ground, and small supplies are procurable. At Shupanga, is the grave of Mrs. Livingstone, and near the mouth of the Ruo, on the Shiré, lie the remains of the ill-fated Bishop Mackenzie, of the Universities' Mission. Just below Shupanga, on the opposite side, near Maruru, is Mutu creek which, during high floods, enables boats to reach Kilimán. (See remarks on East Luabo mouth, pp. 213, 214.) Sena and Tete are the principal settlements of the Portuguese. Zumbo was at one time an important settlement. See distances from entrance, p. 217.

Products.—The country is capable of producing large quantities of wheat, maize, cotton, various kinds of fruits and vegetables, and quantities of ivory are brought to the trading stations. Magnetic ore is found near Tete, and about 4 miles northward of Tete several

seams of coal were seen by Dr. Livingstone, one of which was 25 feet in thickness.

Rapids.—Above Tete are the Kebrabasa or Chinaronga rapids, before mentioned. The lower one of these, named Morambawa rapid, when seen in November (low river), had a fall of 20 feet in a distance of 30 yards. During high river these rapids are said to disappear, and the river is then half a mile wide, but at low river the rapid rushes through a gorge only from 40 to 60 yards wide. These rapids extend nearly to Chicova, a distance of about 80 miles ; in descending one of these Dr. Kirk nearly lost his life. During high river these are said to be smoothed over, but it is very doubtful whether this portion of the river could be made available for trade.

Victoria falls are nearly 1,000 miles by the river from its mouth. Between them and the Kebrabasa rapids, a distance of about 60 miles, are several navigable reaches, but there are also several rapids, the principal of which are the Nakansalo and Kariba rapids, about 200 miles above Zumbo.

The Victoria falls are separated by an island into two portions, the whole measuring about one mile in width. The river drops into a deep chasm from a height of 350 feet, causing a vapour to ascend, which has caused it to be named by the natives the "Mosi oa tanya," or "smoke sounding." From this chasm it rushes in a foaming torrent through precipitous gorges, and finally uniting some miles below.

The **Shiré** river enters the Zambesi river about 110 miles above its mouth ; though narrower than the Zambesi, the water is deeper, but navigation is somewhat impeded by the quantities of weed in its lower portion. The *Pioneer*, drawing $5\frac{1}{2}$ feet, ascended to Chibisa, near the foot of the Murchison falls, but she was delayed between Chibisa and the Ruo branch on her return, for five weeks, owing to the river not rising enough in November to allow her to pass the flats. Vessels of 4 to 5 feet draught can probably reach Ruo river at all times.

The **Murchison** falls on the Shiré are situated 100 miles above its junction with the Zambesi. There are five principal and four minor cataracts, extending over a distance of 40 miles, beyond which the river is navigable to lake Nyassa. The river falls 1,200 feet in 40 miles, and at Mamvira, the lower cataract, the fall is 100 feet in 100 yards. The rise in the river is the same as that of the Zambesi, the larger rise beginning in January..

The distances from the Inhamissengo (Kongoni) mouth are approximately as here stated :—

| | | |
|--|-----------|-----------|
| Maruru (junction with Kilimán, at high river only) | - - - - - | 80 miles. |
| Shupanga | - - - - - | 90 " |
| Junction of the Shiré | - - - - - | 110 " |
| Murchison falls on the Shiré | - - - - - | 300 " |
| Sena on the Zambesi | - - - - - | 140 " |
| Lupata narrows | - - - - - | 240 " |
| Tete | - - - - - | 300 " |
| Kebrabasa rapids | - - - - - | 320 " |
| Zumbo, mouth of Loangwa | - - - - - | 550 " |
| Victoria falls | - - - - - | 1,000 " |

COAST.—From the Muselo the coast trends north-eastward about 56 miles to Kilimán river, in which space there are several rivers. This coast is very low, being scarcely ever seen from the deck in 10 fathoms water ; it is a little higher about 8 or 10 miles south-west of Linde river, and again at Linde river at which place it shows in clumps of trees. A little to the southward of this river there are some sand cliffs separated from the beach by a long lagoon ; these cliffs are conspicuous with the morning sun shining on them.* The current along this coast is generally S.W. one knot an hour.

At about 15 miles from the Muselo, the rivers Inhamhona, Inhamiara, and the Inhaombe, discharge into an estuary about 3 miles in width, and in the centre of which there is a large island.

Here is the harbour of Mitilone, of Livingstone, but we have no information concerning it.

The general soundings along this part of the coast are 4 fathoms at low water at 3 miles from the shore, and from 6 to 9 fathoms at 5 or 6 miles from the shore, except off the entrance of the rivers.†

Linde (Indian) river.—The mouth of this river lies about 31 miles south-west from that of Kilimán. We have no information on the bar other than shown on the chart, which gives a depth of one fathom, at 4 miles off shore. There is a large estuary within the bar, with several islands in it.

The main branch called the Masanzani, was explored for 30 miles, with variable depths to that distance. The brig *Singapore* in 1822,

* Lily Bank.—Lat. $18^{\circ} 35' S.$, long. $36^{\circ} 40\frac{1}{2}' E.$, is the position assigned to the bank upon which H.M.S. *Lily* struck in 1843. This position was crossed and recrossed by H.M.S. *Orestes* in 1851, without finding shoal water.

† See Admiralty chart :—River Zambesi to Mozambique harbour, No. 1810 ; scale $m = 0\cdot 1$ of an inch.

ascended the river about 16 miles, and the least water obtained was 2 fathoms. The Olinda, a stream on the north side of the estuary apparently, was examined by the boats of H.M.S. *Grecian*, for a distance of 12 miles ; the depths ranged from 10 to 5 fathoms.

Linde river may possibly be known by a remarkable clump of trees about $1\frac{1}{2}$ miles to the northward of it, which, when bearing to the westward of North, formerly assumed the form of a camel. For a short distance on each side of the entrance of the river there are no tall trees. The entrance of the river shows well on a N.W. by W. bearing.

The coast between Linde river and Kilimán is quite destitute of trees, but there are several low sand hills and reddish looking patches, and about $2\frac{1}{2}$ miles north-east of Linde river there is a low but remarkable bluff. The soundings off this coast decreased regularly.

KILIMÁN (Quilimane) RIVER lies between Tangalane and Olinda (*Hippopotamus*) points, one mile apart ; there is a depth of 21 feet on the bar at high water, spring tides, which depth, and more, may be carried to the town. The land on both sides of the entrance is low, sandy, and covered with trees or jungle, the south-west side being rather the higher. The black light structure, flagstaff and beacon on Tangalane point are visible some time before the land, which may be safely skirted at a distance of 5 or 6 miles, the outline of the coast being then clearly distinguishable, but as the current is strong and uncertain in the neighbourhood, caution is necessary. The entrance of the river is conspicuous when open on a N.N.W. bearing, the river being wide and nearly straight for 10 or 12 miles ; when abreast of it no land will be visible from the deck between the points of entrance ; but from aloft, Pequena island, which is about 4 miles inside the entrance, will be seen.*

LIGHT.—From a lantern placed over an open truncated pyramid, 19 feet high, painted black, erected on Tangalane point, is exhibited, at an elevation of about 50 feet above the sea, a *fixed* white light, visible in clear weather from a distance of 8 miles. The lighthouse is in lat. $18^{\circ} 1' 24''$ S., long. $36^{\circ} 58' 15''$ E.

Signals.—The lighthouse keeper has the international code of signals, but his interpretation of the signals cannot be depended on. If a message is required to be sent, it is better to land and see him, when it will be forwarded by telegraph to the town.

* See Admiralty plan :—Kilimán river, with view, No. 650 ; scale $m = 1\frac{1}{6}$ inch. Remarks from the survey of H.M.S. *Sylvia*, 1884-5. The light-house has been shifted eastward, and form altered, since the sketch was made, and is painted black.

Outer anchorage.—Should it be desirable to anchor outside the bar, a good position is in 5 fathoms, with the lighthouse bearing N. $\frac{1}{2}$ E., distant 5 miles; a berth may be taken up further out on the same bearing.

Pilot and steam tug.—The only pilot at Kilimán in 1884 was the port captain, who also commanded a small steamer which was sometimes available for towing sailing vessels. The charge for the tug was about 1s. 3d. per gross ton register, and for pilotage in and out, about £10.

Pilotage dues are compulsory, men of war excepted, (1887).

The RIVER is entered between Tangalane point and Olinda point; from thence there are three channels to the town, named respectively Olinda, Militáo, and East channel; the Militáo appears to be the best.

The bar extended $4\frac{1}{2}$ miles from the lighthouse in 1884; it is said to vary a little in different seasons, and especially after south-west gales. At high water it is generally smooth.

The bar has about 21 feet at high water springs; thence between Carallos, Marinhos, and Tangalane banks, the channel is about one mile wide with much deeper water.

The channel formerly known as the boat channel, close along Olinda point, is closed, but it is possible that it may again become available for boats.

Beacon.—Buoys.—A beacon about 40 feet high is erected on Tangalane point, northward of the lighthouse, which kept in line with the lighthouse leads in the best water over the bar. The beacon is moved to meet any change in the bar channel.

A red buoy is moored within the bar, near the south-west extreme of Tangalane banks, with the lighthouse bearing N. $\frac{3}{4}$ E., distant $2\frac{3}{4}$ miles. Two red buoys are moored at the entrance to Olinda channel, with the lighthouse bearing respectively E. $\frac{1}{4}$ S., three-quarters of a mile, and E. $\frac{3}{4}$ S., $1\frac{3}{10}$ miles distant; a red buoy is also moored close to the south-west edge of Militáo bank, west end of Olinda channel. The positions of these buoys are not to be depended on, as they are moved when the channel alters.

Tides.—It is high water, full and change, at about 4h. 20m.; springs rise $12\frac{1}{2}$ feet, neaps $7\frac{1}{2}$ feet; the tides are said to be irregular, and to extend 50 miles up the river.

The streams run about 3 knots an hour in the river; after crossing the bar and nearing the lighthouse, the flood sets directly on to the banks off Olinda point, rendering great care necessary.

The ebb commences at Olinda point about half an hour before it does at Tangalane point.

Current.—The current generally sets from one to 2 miles an hour to the south-westward, causing vessels at anchor off the bar to lie broadside to the swell and roll considerably.

Bar.—Directions.—The British India steamers, drawing 15 feet, enter the river and proceed to the town, the pilot boarding them off the lighthouse, but it is not advisable for a vessel drawing over 10 feet to cross the bar without the assistance of the pilot.

To cross the bar by Ship channel, in which there is a depth of about 21 feet at high-water spring tides, bring Tangalane lighthouse in line with the beacon, and steer for it, guarding against the westerly set of the flood, until about one mile from the lighthouse, when it may be brought a little on the starboard bow, and passed at between 2 and 3 cables distant.*

Anchorage.—There is very good anchorage about one mile north-westward of the lighthouse, northward of the creek, in about 5 fathoms; the tide runs about 3 knots an hour. If proceeding to the town, see directions on next page.

Caution.—As before stated, the beacon in rear of the lighthouse is shifted when any change in the bar occurs, the two in line marking the best water; and the breakers are said to be a better guide than the chart. Much precaution is therefore necessary, especially in boats crossing, as the breakers are so treacherous, that a solitary wave at times comes in and breaks heavily when the water on the bar appeared smooth immediately before. Many lives have been lost, amongst others a native pilot of experience and all his crew perished.

CHANNELS TO THE TOWN.—Pequena island, situated in mid-river, is low and covered with dense jungle; extensive banks extend both north and south of this island, leaving a channel to the town close along both shores.

Militão bank separates Olinda and Militão channels; it dries for a distance of 2 miles in a north-west and south-east direction, and $1\frac{1}{4}$ miles north and south.

Militão channel, with an average width of half a mile, is between Militão bank and the bank extending southward from Pequena island, it is straighter, has more water, and is easier of navigation than Olinda channel.

* Bar directions for 1885.

Directions.—From abreast Tangalane lighthouse, just open the east extreme of Pequena island of the extreme of the land beyond it, N. by W. $\frac{1}{2}$ W., and steer for it; this mark will lead eastward of Militáo bank (and on to the tail of Pequena bank). When the red tiled house on the west bank of the river, and 3 miles north-west of Olinda point, bears W. by N. $\frac{1}{2}$ N., the course should be altered to N.W. by W., until the red tiled house bears W. by N., which being steered for leads through Militáo channel. When the west extreme of Pequena island bears North, steer N.W. until within 2 cables of the west bank of the river, which may thence be followed to the town, off which there is anchorage in from 3 to 4 fathoms, mud bottom.

The streams run across both ends of Militáo channel, but straight through the other parts.

East channel runs close along the eastern bank of the river, and has a depth of 21 feet at high water; from abreast the lighthouse the river bank should be followed, at about one cable distant, until abreast the north-west end of Pequena island, where a shoal extends $1\frac{1}{2}$ cables from a rounded point; after passing this shoal the shore may again be followed to the town.

Olinda channel is southward of Militáo bank, and was almost entirely that used previous to the survey in 1885. It is obstructed by shoals, a strong current sets across it, and no directions can be given that would be of use to a stranger.

KILIMÁN is situated on the eastern or left bank of the river, at 10 miles above Tangalane point at the entrance. It ranks next in importance to Mozambique, and is the head-quarters of the Zambesi trade. The church and barracks are conspicuous buildings, and the town is surrounded by cocoa-nut trees. There is a landing available at all times of tide, close to the custom house and jetty government offices.

Moorings are laid for two government steam vessels off the landing place, and the mud bottom is very soft.

Trade.—The African Lake Company have their head quarters at Kilimán, and with other European firms do a considerable export trade in oil-seeds, ivory, rubber, skins and beeswax. The imports are fire-arms, cotton goods, knives, toys, and beads. The value of the exports in 1885 amounted to about £95,000, nine-tenths of which were seeds and ivory; the imports amounted to £103,000.

The population consists of a Portuguese military commandant and other government officials, a few Europeans, some half-caste soldiers, and about two thousand blacks (1888).

Supplies.—Fresh provisions, beef, poultry, vegetables, and fruit can be obtained in small quantities ; the water, obtained from wells in the sand, is scarce and bad.

Except beef, provisions may be obtained cheaper by anchoring on the west shore 6 or 7 miles below the town, where the natives bring supplies down. Stores are scarce and dear.

Slight repairs to vessels, such as carpenters', blacksmiths', and caulkers' work, can be effected at reasonable rates. About 12 vessels enter the port annually besides mail steamers and coasting craft.

Mails.—See page 8.

Winds.—The prevailing wind off Kilimán is from S.E. to South during the greater part of the year. From January to March probably it is westward of South. Whilst lying off Kilimán in October, the winds varied from S.S.E. to E.S.E., and blew throughout the night, only lulling in the morning ; but this is unusual, a land wind generally setting off at night. Off the town, in July, the sea breeze from about S.S.E. was observed to set in at noon with a force of 1 to 3 ; during the night it was usually calm, with the land breeze in the morning.

Climate.—The climate is unhealthy, and said to be unfit for Europeans. Temperature in the early morning (July) has been noted as low as 62°. The heaviest rains occur in January and February, accompanied by much lightning. See also page 19.

COAST.—About 14 miles north-eastward of Kilimán river is the first patch of casuarina trees, the lofty trees on the intervening space being all palms or cocoa-nut.* The coast is low and sandy, with jungle in the background, as far as cape Fitzwilliam.

Brisk bank.—The depths along this coast decrease regularly on approaching the land, but there is a rocky bank in about lat. 17° 55' S., long. 37° 17' E., at about 12 miles from the shore. H.M.S. *Brisk* passed over this bank, obtaining 7 fathoms least water.

Rivers.—There are eight rivers between Kilimán and cape Fitzwilliam, namely, the Macuse, Mariangoma, Likugu (Mumwodo), Iugue, Mwabala, Raraka (Iumane), Mraizi (Mazemba), and Monega (Kizungu). The Macuse and Moniga are accessible to light draught vessels.†

The Likugu, rising in the hills south-eastward of lake Shirwa, is the largest of these rivers, but its bar is not passable. Within the bar it is said to be navigable for boats for 8 or 10 days' journey.

* See Admiralty chart, River Zambesi to Mozambique, No. 1810 ; scale, $m = 0\cdot1$ of an inch.

† Consul O'Neill, in proceedings of Royal Geographical Society, 1882, page 599.

Macuse (Mecusa) river is about 22 miles north-eastward of Kilimán. A patch of casuarina trees forms its western point of entrance, and a rather bluff point the eastern one. The bar of the river, about half a mile wide, is situated $2\frac{1}{2}$ to 3 miles from the land, and has a depth of 18 feet at high water, and fair anchorage inside.*

In entering, steer with the west end of the casuarina trees at the mouth of the river bearing North, and when distant half a mile from the entrance, alter course to pass a quarter of a mile from the trees, and thence up the middle of the river until the first house is seen on the starboard hand; then anchor. These directions applied to the year 1879, and must be used with caution, as the bar probably shifts.

Guard against the tide in entering; the flood sets to the westward, the ebb to the eastward. No pilots are available. Fresh water and fruit may be obtained, but no other supplies.

It is high water full and change at Macuse river at 4h. 0m.; springs rise 14 feet, neaps 12 feet.

Mazemba (Mriazi) river is about 10 miles south-westward of cape Fitzwilliam, and is tolerably safe for entering in a boat. The boats of H.M.S. *Persian*, in 1845, found a depth of 3 fathoms on the bar at high water, and from 6 to 4 fathoms for a distance of 30 miles up the river.

It is probably barred in the dry season; the Monega, to the eastward, was reported (1882) to be the best port in this locality.

There is a channel from the Mazemba to the Tejungo, with about 2 fathoms at low water, northward of the island which separates the two rivers. Several streams flow into the Mazemba, with entrances so wide that it is not easy to distinguish which is the main river. The river abounds with hippopotami.

Supplies.—Plenty of stock can be obtained by barter from the natives, at the entrance of the river.

MONEGA (TEJUNGO) or KIZUNGU RIVER enters the sea on the eastern side of Kizungu island, at about 5 miles westward of cape Fitzwilliam, and is connected with the Mazemba by a channel leading northward of Kizungu island.

Consul O'Neill, 1882, states that "the Tejungo is the only port worthy of the name between Kilimán and Angoche, to both of which it is in many respects superior"; notwithstanding, the bar is probably subject to great changes, as the bar was not passable by

* Captain F. Elton crossed the bar in a schooner of 80 tons; he states that the channel is preferable to the Kilimán, with which river it communicates in the interior.

the boats of the *Persian* in 1845 on account of the surf, whilst the Mazemba had 3 fathoms over it. Between the Mazemba and Tejungo the land is rather high, of a hummocky appearance, with two remarkable trees on its extreme decline eastward; these trees stand midway between the two rivers. The entrance of the Tejungo is more perceptible than that of the Mazemba; a low point covered with trees forms its south-west point, and cape Fitzwilliam stands out boldly to the eastward of it. Shallow water extends a considerable distance off the river, there being but 5 fathoms at about 5 miles off shore.

The town of Monega is about 7 miles up the Tejungo. There are no Europeans here.

Capt. Thos. Le H. Ward, H.M.S. *Thetis*, Aug. 1875, writes:—The Tejungo has a fine deep entrance running nearly north and south between two lines of breakers about half a mile in length and a quarter of a mile in breadth, 3 fathoms was the least water obtained on the bar, which did not break as it was crossed, it being then nearly low water. Inside the bar there is a land-locked anchorage for vessels of any size in 8 or 9 fathoms. The river, however, very soon becomes shallow, being navigable for some 20 miles from its mouth for dhows and boats only. The river, like the rest on this coast, is lined with mangrove bushes near its mouth, but in proceeding up there is a fine open country with numerous indications of large game.

CAPE FITZWILLIAM, about 5 miles eastward of the Monega, is a remarkable bluff composed of yellow earth cliffs, with a few rocks around them on the beach. This cape and cape Edward are the most remarkable points along this part of the coast.

Cape Edward is a remarkable bluff formed of red earth cliffs, with a sandy beach and a few rocks at the base of the cliffs. This cape is 6 miles eastward of cape Fitzwilliam, the land between being very low, with Mlai creek about midway.

COAST.—From cape Edward, eastward to Macalonga point (Ras Nelide), distant about 44 miles, the coast is nearly straight. Between these points are the Namanwe and Mlela streams entering the sea on either side of Yusi island; the Maravoni (Mwebazi), Molugwi, and the Mwalaka (formerly known as the delta of the Quizungo, but found to be three distinct rivers), and the Eredni, situated about 10 miles westward of Macalonga point.* Between the Eredni and

* Vidal places this river 13 miles westward of the point, and north from Fogo island.

the point, the coast is composed of low sand hills with a few scattered trees. The bar of the Eredni in 1875 was found impracticable for a gun boat. On the north side of the river, within its mouth, is a red cliff which may serve to distinguish it.

PRIMEIRA ISLANDS and SHOALS.—The Primeira and Angoche (Angoxa) islands and shoals are on the outer edge of a coral bank fronting the shore to a distance varying from 5 to 25 miles. The channels between them and the main have from 7 to 11 fathoms, the deepest water being on the island's side.

Pantaloons shoal, the westernmost of these groups, is in lat. $17^{\circ} 42\frac{1}{2}'$ S., long. about $38^{\circ} 2'$ E., its extent being $1\frac{1}{2}$ miles east and west, by three-quarters of a mile north and south, with a least depth of $3\frac{1}{2}$ fathoms. There are several knolls with from $4\frac{1}{2}$ to 5 fathoms on them.

A patch of 6 fathoms lies 5 miles E. $\frac{1}{2}$ S. of Pantaloons shoal; these shoals are steep-to.

Acorn patch, in lat. $17^{\circ} 36'$ S., long. about $38^{\circ} 13'$ E., does not appear to have been closely examined, and should be approached with caution. H.M.S. *Acorn* touched lightly on it.* H.M.S. *Dart* found $5\frac{1}{2}$ fathoms, and the sea was observed breaking at a short distance from her. At a mile distance, all round the shoal, soundings of from 20 to 40 fathoms were found.†

David shoals consist of two rocky patches about midway between Acorn patch and Silva island. The north-eastern one of $3\frac{1}{2}$ fathoms lies with Silva island, bearing E.N.E. distant about 18 miles. The western patch of 8 fathoms lies about $3\frac{1}{2}$ miles from the eastern one; they are apparently steep-to.

Silva (Mahiazo) island, in lat. $17^{\circ} 18'$ S., long. $38^{\circ} 49'$ E., is the westernmost of the Primeira islands, and about 13 miles from the coast.‡ It is composed of bare sand, about 10 feet high, and surrounded by reefs which extend about three-quarters of a mile. Vessels may pass between Silva and Fogo in 14 and 15 fathoms, keeping nearest to the latter.

Fogo (Malibono) island, 5 miles north-eastward of Silva island, is surrounded by reefs which extends about one mile, except

* Commander J. Adams, R.N., 1840.

† G. A. Stabb, Master, R.N., 1852.

‡ Vidal.

on the north side, which is bolder. It has a few trees on its north end ; the other part is covered with short green shrub.*

A vessel may anchor in 10 fathoms, at 3 or 4 cables from the beach, with the centre of the island bearing from S. by E. to S. by W.

When standing from the main land towards the anchorage, the soundings suddenly deepen from 10 to 20 fathoms, and then quickly back to 10 again, at about 5 cables from the island. There is no fresh water to be obtained on the island.

Crown island, 20 feet high, is about 4 miles north-eastward of Fogo, and 8 miles westward of the Casuarina island reefs. It is composed of sand, with a few grasses on it, and surrounded by a reef to the distance of half a mile.* The channels between Fogo and Crown island, and between the latter and Casuarina, are clear, with a depth of 14 or 15 fathoms.

Shoal.—The British India steam-vessel *Sokotra*, when in lat. $17^{\circ} 16' S.$, long. $39^{\circ} 00' E.$, passed over shoal ground in 8 fathoms ; breakers at the time being observed at quarter of a mile distant to the westward.

Casuarina (Tanibi) island lies nearly 10 miles north-eastward of Crown island ; it is covered with Casuarina trees, which are high, particularly on its north-east end. The reef surrounding the island, extends from 2 to 3 miles north-east, south, and south-west from its leaving a clear passage about one mile wide between it and the reefs off Epidendron. There is no water on this island. The timber, although heavy when first cut, makes strong spars, but the trees are not permitted to be cut for firewood.

Casuarina road, between the island and the mainland, forms the best anchorage along this coast. If going in from the northward, keep Casuarina open northward of Epidendron, to pass north-west of Barraco reef and the reef to the eastward of it : the soundings are regular. A vessel may anchor in $8\frac{1}{2}$ fathoms, with Casuarina S.S.E. $\frac{1}{2}$ E. and Epidendron E.S.E., but the best anchorage, to be out of the swell, is in 9 or 10 fathoms, about equidistant from the two islands.

Tides—It is high water at Casuarina island, at 4 h. 15 m. The current runs generally south-westward, but occasionally north-eastward.

Epidendron (Maloa) island, the easternmost of the Primeira group, lies about 6 miles from Macalonga point.* The northern part

* Vidal. It is probable that the vegetation on these islands has somewhat altered in appearance since these remarks were made.

of the island has casuarina trees on it, but the southern part is covered with short shrubs only, though when seen from the southward the island appears as if covered with trees. Similar to Casuarina island it has an extensive reef on all sides except the north-west. Epidendron island dips from a vessel's deck at a distance of about 15 miles.

Barraco reef lies about E. by N. distant 3 miles from Epidendron. There is another small rocky patch, on which the sea breaks, 2 miles farther in the same direction.* These dangers do not appear to have been examined.

COAST.—Rivers.—North-eastward of Macalonga point, between it and Angoche, are the Ligonya, Moma, Mwaladi, Laridi, Namakuti, and Natiti rivers, the last mentioned is the southern mouth of the Angoche. The Moma is the most important of these rivers, as it possesses an anchorage within, but the bar is bad, (*see below*).

Mount Cockburn (Mlungugi), in lat. about $16^{\circ} 29' S.$, long. $38^{\circ} 55' E.$, and the only mountain seen on this part of the coast, is a remarkable cone of considerable elevation.

Moma river, in lat. $16^{\circ} 45' S.$ —H.M.S. *Thetis* anchored in August with mount Cockburn bearing N.W. $\frac{1}{4}$ N., and Caldeira point N.E. by E. $\frac{1}{4}$ E. in 9 fathoms, sand and mud, good holding ground. The ship rolled heavily, being kept broadside to the swell by the prevailing current which at this season always sets along the coast to the south-westward, with more or less strength. The heavy rolling sea from the southward, at times had more the character of rollers on a bar than that which might be expected in an open roadstead.

The bar at the entrance of the Moma river is a long and heavy one ; the best time for crossing is said to be the early morning, if the tide suits. The boats of the *Thetis* crossed soon after daylight without difficulty. In coming out in the afternoon most of the boats were in tow of a Portuguese gunboat, but the galley and steam cutter which went out separately encountered two or three heavy rollers which nearly filled the former, the latter was protected by a canopy.† There is a capacious anchorage inside, but on account of the bad bar, few coasters visit it.‡

Caldeira point (or Black rock point), about 15 miles eastward of the Moma, is rather higher than the adjoining coast. It is fronted

* Vidal.

† Capt. Thos. Le H. Ward.

‡ Consul O'Neill, 1880.

by a ledge of flat rocks, dry at low water, and a large black rock lies about half a mile north-eastward of the point.

Angoche point (pronounced Angosha), at about 25 miles north-eastward of Caldeira point, is low, and appears like a number of small sand hillocks. It is bordered by a dry sand bank in the form of a crescent at the distance of about half a mile. Southward of Angoche point are several small inlets, which probably communicate with Angoche river. At 3 miles to the northward of Angoche point, there was in 1823 a remarkable tree, resembling at a distance a ship under full sail, the most conspicuous object on this part of the coast, and visible from a distance of 12 miles.

ANGOCHE ISLANDS—**Moma island** (*Fungu Koru*), lying 8 miles southward of Caldeira point, is a sand island from 15 to 20 feet high, surrounded by a reef which extends southward more than half a mile from it.*

A bank with 5 fathoms, bearing S.W. by W., 9 miles from Moma island, was reported by Captain Wyvill, of H.M.S. *Cleopatra* in 1843

Another small bank appears on the chart about $2\frac{1}{2}$ miles S.W. by W. of Moma island; but we have no information about it.

Caution.—The soundings between Moma and Caldeira islands are irregular, and with Caldeira and Hurd island in line, the water shoals in one place to 7 fathoms and the bottom is plainly visible.

Caldeira (Kirubi) island, in lat. $16^{\circ} 38' S.$, long. $39^{\circ} 44' E.$, lies 12 miles eastward of Caldeira point. It is a small sandy island with a few casuarina trees, and surrounded by reefs extending off about one mile, except on its northern side.*

Hurd island, lying nearly 6 miles north-eastward of Caldeira island, is low, sandy, and covered with trees. On its east-north-east, south, and west-south-west sides the reef extends off about $1\frac{1}{2}$ miles.

Michael reef (Fungu Namakuti), lies 5 miles north-eastward of Hurd island, and about the same distance from the main. It is a dangerous reef of rocks uncovered at low water, and $1\frac{1}{2}$ miles in extent. It should be given a berth of one mile.

Walker island (Puge Puge), lies about 5 miles north-eastward of Michael reef, and $2\frac{1}{2}$ miles off Angoche point. At high water, Walker island shows only as a small sand cay 6 or 8 feet above the sea. It is surrounded with reefs which extend on its east, south, and south-west sides, in some places, $1\frac{1}{2}$ miles.

* Vidal.

Mafamede island (Kisiwa Sultani Hassan), lying about $8\frac{1}{2}$ miles north-eastward of Walker island, and nearly abreast the mouth of Angoche river, distant 7 miles, is a low sandy island, about a third of a mile long, mostly covered with tall casuarina trees, and may be seen 12 or 15 miles distant. A coral reef extends from $1\frac{1}{2}$ to 2 miles north-eastward, south, and south-westward. On the north-west side of the island the shore is fairly steep and the landing good.

H.M.S. *Brisk* anchored in 10 fathoms, with the centre of the island, S.E. by S. distant 9 cables, the extremes of reef (dry at low water) bearing E. by S., and South nearly. This is a good safe anchorage, but not over smooth; a berth nearer the island may be chosen if desired. There is no water on Mafamede; it is not desirable that the trees should be cut down for firewood on this and similar islands, because they are so useful in showing their position.

A Sand patch, half a cable in extent, bears N. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles from the centre of Mafamede. It has a least depth of $3\frac{1}{2}$ fathoms at low water springs; another patch with 5 fathoms water, lies 3 cables east of it, with a channel of 7 fathoms between these patches.

ANGOCHE (Mluli) RIVER (pronounced Angosha).—This river is about 3 miles in width at the entrance, in which there are three islands, and there is reported to be a depth of 20 feet over the bar at high water springs. Vessels of 14 feet draught have crossed the bar. The Angoche is wide and deep for 20 miles, and is reported by the natives to be navigable for small vessels for about 150 miles. Considerable trade is carried on by coasters with Mozambique.

The land to the northward of the river is a low sandy cliff, topped with trees. Southward of the river the land is lower, with some large and remarkable trees on the south point, between which and another clump 3 miles farther south, is a village. The entrance to the river is about N. by W. from Mafamede island, and with the clump of casuarina trees on Monkey or Busio (the north-eastern) islet, will serve to identify it.

Anchorage.—There is anchorage in 4 fathoms, with Nepatulah point (east point of river) bearing N. by W., and the north-east point of Busio island N.W. by W., not far from the edge of the bank. Large vessels should anchor farther to the south-eastward in about 7 fathoms.

Bar.—The lower reach of the river trends in an easterly direction in a straight line for 10 or 12 miles, nearly one mile in width, the main body of water passing between Busio (Monkey) island and the north shore, after which it is deflected southward to the bar by the

north-eastern shoals, the bar being about 2 miles from the north shore, the same distance from Monkey island, and with a depth of 20 feet at high water springs.

Directions.—To approach the bar, bring Nepatulah, the east point of entrance, to bear N. by W., or Mafamede island S. by E., and keep them so, taking care in steering to the northward to allow for the usual set to the westward. These bearings will lead across the bar, but the eye is the only guide for taking the deepest water, as the bar is liable to shift, and there are no marks on shore. When within the bar keep along the north shore, and anchor abreast Parrapalo settlement in 6 or 7 fathoms. With a moderate swell only, the entrance will show by the breakers on each side, otherwise the bar should not be attempted. At last quarter flood it is generally smooth all over. It has been said that this bar may be crossed in almost any weather, and to be safer than the Kilimán or Inhamissengo.

When outside the bar keep a good look out for any appearance of breakers, for there are some patches of shoal ground, which breaks nearly one mile outside the regular bar. These may be seen at a distance and avoided.

There is a boat channel westward of Busio (Monkey), and which may be used with advantage when leaving the river in moderate weather, as the channel is winding and protected by the breakers on each side, but it would be difficult to find when entering the river.

Busio, Mbuzi or Monkey island and two or three others lie within the bar and to the southward of the entrance. An extensive sand spit runs off from the east-north-east end of Monkey island, which should be left on the port hand when entering the river.

The inner end of Monkey island is well adapted for a stopping place for boats, being sheltered and smooth water, with a depth of 3 fathoms alongside a steep sandy beach. The boats' crews of H.M. ships *Brisk* and *Lyra* encamped here, and found good water in the midst of a remarkable clump of casuarina trees on the west end, by digging a couple of feet. There are casuarina trees also on the east side of the island, but here no water was found.

Settlements.—There is a Portuguese settlement and Custom house on the north point of the river, named Parrapalo (Panapato). A large quantity of india-rubber, ivory, ebony, seeds, gum copal, cocoa-nut oil, coir, and ground nuts are collected here, and conveyed to Mozambique by coasting craft.

Angoche.—The town of Angoche, built partly of wood and partly of stone, and situated on a sandy plain near a creek, some

20 miles up the river on the south bank, is protected by a small fort ; it is the residence of a Portuguese governor, garrisoned by 80 Portuguese soldiers, and contains about 1,000 inhabitants. The number of inhabitants varies much according to the time of year, as they are principally engaged in trading to Zanzibar and other places. They are generally armed with spears and a few muskets, and are not to be trusted. The creek leading from the river to the town cannot be reached by boats before half flood. The Sultan of Angoche lives in the country, about 6 miles from the town ; the road to his abode being either a swamp, or composed of dry caked mud, according to the season.

Winds.—The usual sea breeze varies according to the monsoon from E.N.E. to S.W. In November it was found to blow fresh at E.N.E., falling light at night, and hauling to the N.N.E. in the early morning. At this time of year strong south-westerly winds with a heavy swell, and rainy weather occasionally occur, this being the commencement of the rainy season.

Tides.—It is high water, full and change, at the mouth of the Angoche at 4h. 0m. ; springs rise 10 or 12 feet.

COAST.—From the Angoche northward, the coast is composed of sand hills, which increase in height until reaching the south side of Antonio river, where they are said to be 300 or 400 feet high, and have several patches of bright red sand. The land in the vicinity of Antonio river is remarkable, the northern side of the river being a low sandy point, whilst the high sand hills on the south side, partly covered with vegetation, form a striking contrast to two rocky points 4 or 5 miles to the southward of the river.

Nanduma hills, from 2,000 to 3,000 feet high, are charted about 15 miles from the coast, and should be conspicuous objects from seaward.

Antonio (Veve or Jamaguva) bank is a coral bank, about $2\frac{1}{4}$ miles long, north-east and south-west, by $1\frac{1}{2}$ miles wide, with some dry sandy patches on its south-west end, and steep-to.

Its dry portion is charted in lat. $16^{\circ} 9' S.$, long. $40^{\circ} 10' E.$, or with Buzio island, Angoche river, bearing W. by S., distant 13 miles, but its position is not correctly known.

About midway between Antonio bank and the shore is a shoal of 3 fathoms or less, rendering it advisable to pass seaward of Antonio bank.

About 5 or 6 miles off the coast, abreast Antonio river, are several patches or ridges of 5 fathoms, with the bottom distinctly visible.

Caution.—At night it is advisable not to stand into less than 20 fathoms between Angoche and Mozambique, as the banks are mostly steep-to, and the coast is but imperfectly known.

ANTONIO RIVER lies about 22 miles northward of Angoche. Its south point is in lat. $15^{\circ} 57' S.$, long. $40^{\circ} 9' E.$ *

Its entrance is fronted by a bar apparently about one mile in breadth, with a depth of 3 feet at low water, or about 16 feet at high water springs. Within the entrance the river turns sharply to the southward, with depth of from 2 to 4 fathoms at low water.

Settlement.—About 3 miles within the entrance, on the southern shore, is the settlement of Shangaji, which carries on a considerable trade with Mozambique, similar, though of less extent, to that from the Angoche river.

Directions.—The Tamarisk trees on the north point of entrance, bearing W.N.W., lead in the best water over the bar. It was formerly stated (1862), to be only fit for boats, but many small trading craft now enter the river.

COAST.—Huddart shoal, the centre of which, in lat. $15^{\circ} 46\frac{1}{2}' S.$, long. $40^{\circ} 26' E.$, is about 7 miles off shore, and 19 miles north-eastward of Antonio river.† Captain Vidal passed over this shoal in $3\frac{1}{2}$ fathoms, but thinks there is less water in places, as the sea sometimes breaks.

MOGINKWALE POINT AND RIVER. — Namalungo (Moginkwale) point at 26 miles north-eastward of Antonio river, is a high sandy bluff, well wooded; a reef of rocks and sand bank fringes it to the distance of about half a mile. From abreast the point, the distant land behind is rather high, and that close to the beach low and sandy, with casuarina trees upon it. The sandy beach is broken in places with openings like the mouths of small rivers. The entrance to the river Moginkwale lies about 5 miles northward of the point, and a depth of $2\frac{1}{2}$ fathoms can be carried over the bar at high water springs, but there are often heavy rollers on the bar without any apparent cause.‡

The Portuguese have a military station here.

Chataputa or Moginkwale shoals lie off the Moginkwale river, about $4\frac{1}{2}$ miles from the line of coast. They consist of several rocky patches, on which the sea generally breaks. Their extent is not known.

* See plan of Antonio river on chart No. 1810.

† Vidal.

‡ See plan of Moginkwale entrance on Chart No. 1810.

Barracouta point, about 4 miles north-eastward of Moginkwale entrance, is extremely low, has a remarkable tree on it, and forms the northern point of Barawa or Manamitya river, which appears barred and shallow.*

A horse-shoe reef extends nearly 2 miles from the point. On some parts of the reef there is but a depth of 7 or 8 feet, whilst within the horse-shoe, which opens to the north-west, there is 5 fathoms.

In January, 1875, the *Thetis* anchored about 7 miles off this point in 15 fathoms, hard sandy bottom, with Bajone shoal North, about 4 miles; a shoal was observed about one mile west of this anchorage, and the bottom generally in this locality is foul. The *Thetis* swung regularly with the tide, at this anchorage, the ebb running northward and the flood southward.

MUITÉ RIVER.—The Infussé Bar is the chief entrance to Muité river, and, from its being the most important one, it sometimes gives its name to the lagoon system within. It is said to have a depth of 16 feet on the bar at high water.†

The Muité and other streams within the bar are usually navigable for dhows at high water, though crossing the bar is attended with some anxiety. These streams are intersected by creeks lined with mangrove bushes, and divided by large tracts of low land, partly inundated, on which are several villages surrounded by cultivated land. Mokolivolane, on one of the southern streams, is apparently the principal village.

Bajone shoal, in lat. $15^{\circ} 28\frac{1}{2}'$ S., long. $40^{\circ} 39'$ E., lies about $3\frac{1}{2}$ miles off Infussé bar. It is a patch of rocks having 5 fathoms water, or less, with 14 fathoms close-to.* A patch of $4\frac{3}{4}$ fathoms is charted between it and Barracouta point.

NAKIBU SHOAL.—From about 2 miles northward of Infussé bar, the coast is fronted by foul ground, with patches of one fathom, or less, for a distance of 10 miles, at which distance it extends about 4 miles off shore. Here at its north-eastern extremity is a cluster of rocks, named Nakibu shoal, $1\frac{1}{2}$ cables in extent, in parts uncovered at low water, and generally breaking heavily; it lies with Namarema river bearing W. by N., distant 5 or 6 miles. Bajone point bearing N.W. by N., apparently leads well eastward of it.

* Vidal.

† See plan of Infussé bar on Chart No. 1810. Information from Foreign Office letter, September, 1886.

Bajone point or Ras Mtende is low, sandy, and covered with trees to the beach. It should be given a wide berth. The coast from Bajone point to Mudge point, Mokambo bay, is foul and apparently shallow.

MOKAMBO BAY is formed between Bajone and Sancoul points, 9 miles apart. This bay is deep and unfit for anchoring, but there is a spacious basin, named port Mokambo at its head. The north shore of the bay should be given a berth of about 2 miles to clear Peel bank, which extends southward a considerable distance from some remarkable looking rocks on the beach. This low shore should not be approached at night, as the water is deep close to the reefs. The south shore, also, as before mentioned, is apparently foul.*

Mudge reef extends $1\frac{3}{4}$ miles E. by N. $\frac{1}{2}$ N. from Mudge point (Ras Kisarahondo); the latter being nearly an island connected to the main by a neck of land which is just awash at high water. Mudge reef lies much in the fairway of the entrance to port Mokambo, but having passed north-eastward of it, bring William point, open of Mudge point, which will lead westward of the reef; the north-west face of Mudge point is steep-to.

PORT MOKAMBO, or Kivolani bay, is a spacious basin 4 miles in diameter, comparatively free from shoals, and with depths in most places of from 10 to 15 fathoms.

Reefs.—The eastern side of the port from William point to Kivolani village, is bordered by a flat with $1\frac{1}{2}$ fathoms water on its edge.† On the western side of the port are rocky shoals with $1\frac{1}{2}$ and 2 fathoms water, extending $1\frac{1}{2}$ miles in a north-east and south-west direction. Between these reefs and Kivolani there is anchoring space of about 2 miles, with from 8 to 15 fathoms water.

The entrance to the port, $1\frac{1}{2}$ miles in width, is between Mokambo point or Ras Fugu, and Mudge and William points; the channel between is clear, with the exception of the reef off William point. William point is conspicuous, with a projecting reef dry at low water to the distance of 3 cables. A detached reef with about 3 feet at low water, lies two-thirds of a mile nearly N.W. by N. of William point.‡

Directions.—To enter port Mokambo, bring Mokambo peak, 135 feet high, on the north shore of the port, to bear W. by N. $\frac{1}{2}$ N., and

* See Admiralty plans—Conducia, Mozambique, and Mokambo ports, No. 653; scale, $m=0.8$ inch.

† Owen.

‡ W. J. Wheeler, Master, R.N., 1840.

then steer for it. This line will lead a long half mile southward of Peel bank and nearly the same distance northward of Mudge reef. When William point is open of Mudge point, keep in mid-channel.

If proceeding to the north side of the port, Mokambo point may be passed close to, in deep water. A sand flat fills the bay close westward of Mokambo point, partly dry at low water. A vessel may steer along the edge of these flats by the lead to the north shore, or keep some trees on Mudge point open of Mokambo point, hauling in and anchoring in $8\frac{1}{2}$ fathoms, with a red house in the village at Lungo river bearing N. $\frac{1}{2}$ W., and Mokambo point S.E. by E. In this position, a vessel will be about 4 cables from the beach where the village stands, and about 2 cables north-eastward of the rocky shoal, which extends three-quarters of a mile from the eastern shore, south-west of the village, and which at low water has only one foot on the shoalest part.

If proceeding to the southern side of the port : from mid-channel between Mokambo and Mudge points, steer about West, giving William point a berth of one mile, or bring Mokambo point to bear eastward of N.E. until William point bears S.E. ; a vessel may anchor in 14 fathoms, with Mokambo peak bearing N. by E. and William point N.E. by E. $\frac{1}{2}$ E.

Mokambo is governed by an independent chief, but there is a colony of Arabs who monopolize the trade.

At a village S.S.W. from the southern anchorage, there is a small well under a tree. By digging the well deeper, and the use of the fire engine, 6 tons of water per day were obtained.

Supplies.—Supplies of poultry and vegetables were plentiful, and the native chief of the village at Lungo river filled our water casks, on the beach, for three-quarters of a dollar a ton. This is the best way to water, as the entrance of that river is very shallow, only admitting small boats, which makes watering tedious, and exposes the crew.*

Tumonia river, in the south-west corner of port Mokambo, is about 5 or 6 miles from the entrance, and has good depths for small craft;† its mouth is fronted by shoals, but there are depths of 4 fathoms between them and the river.

It has been reported that there are hot springs about 3 miles from the mouth of the river.

Tides.—It is high water, full and change, in port Mokambo about the same time as in Mozambique harbour, viz. : at 4 h. 15 m.; and the rise and fall at springs 12 feet.

* Commander E. Peel, R.N., 1845.

† Owen.

CHAPTER VII.

MOZAMBIQUE HARBOUR TO CAPE DELGADO.

(Lat. 15° S. to lat. 10° 40' S.)

VARIATION IN 1889 :—

| | | | | | | |
|--------------|---|---|---|---|---|------------|
| Mozambique | - | - | - | - | - | 14° 0' W. |
| Pomba bay | - | - | - | - | - | 13° 0' W. |
| Ibo island | - | - | - | - | - | 12° 30' W. |
| Cape Delgado | - | - | - | - | - | 11° 30' W. |

MOZAMBIQUE HARBOUR.—Mozambique is the headquarters of the Portuguese on the east coast of Africa. The harbour is formed by an inlet $5\frac{1}{2}$ miles in length, and the same in breadth, receiving the waters of three small streams at its head. At the entrance are the islands of St. George and St. Jago, and farther in the island of Mozambique, which, together with reefs and shoals, render the anchorage perfectly safe (except perhaps during a hurricane) for all classes of vessels; but too much dependence must not be placed on the chart, as the depths in places are stated to have shoaled since the original survey. The North channel is buoyed and lighted, and should be always taken by large vessels.

Landmarks.—The land is all low about Mozambique harbour, and for about 10 miles north and south of it, but St. George island and lighthouse, and fort St. Sebastian with its high flagstaff and Portuguese flag on the eastern extreme of Mozambique island, are conspicuous objects from seaward.*

Pao mountain, situated about 23 miles west-north-westward, and Table mountain, about 19 miles northward of Mozambique island, are remarkable in clear weather; Pao (Matipa) may be likened to a

* See Admiralty plan of Mozambique harbour, No. 652, scale $m=2\cdot0$ inches; and sheet of plans, No. 653. Also charts:—Mozambique to Ras Pekawi, No. 1,809, scale $0\cdot18$ inch; and Comoro islands with the adjacent coasts of Africa and Madagascar, No. 2,762.

small round-topped hill on top of a larger one ; it is, however, not often visible. Table (Meza) mountain, 1,095 feet above the sea, in lat. $14^{\circ} 42\frac{1}{4}'$ S., long. $40^{\circ} 38\frac{1}{2}'$ E., appears as a long flat hill on top of a longer ridge of land, also flat-topped. When seen at a distance, only the upper part of the mountain is visible, and it then makes like a flat island.

When approaching Mozambique, frequent observations should be made for latitude if a bearing of these mountains cannot be taken, as the currents are uncertain.

Currents.—A current generally runs to the southward off Mozambique, varying from 2 to 4 knots, which extends from near the outer reefs of Mozambique to 50 or 80 miles from land, being at its maximum during the strength of the north-east monsoon, and *vice versa*. In July and August, southerly monsoon period, on some occasions, no current has been experienced ; also close in-shore a counter current has been met with : therefore, the prevailing monsoon should be considered when attempting to allow for the current. *See page 24.*

ISLANDS AND REEFS IN THE APPROACHES.—**Sancoul point**, the south-west point of Mozambique inlet, has a few huts on it. All the land between Mokambo, Sancoul, and Calombo, at the head of the inlet, is low.

Sancoul sands, which cover at three-quarters flood, and extend from Sancoul point to Kisumbo point, are in places distant one mile from the shore.

Mozambique flat is a great coral bank which fills the whole space between Sancoul and Kisumbo points on the coast, and the islands of St. Jago and Mozambique. This flat has in most places from 7 to 9 feet at low water spring tides, and small vessels may at most times pass over it, but the sea generally breaks heavily on the south edge between Sancoul point and St. Jago island.

St. George (Goa) island, lying immediately in the approach to Mozambique harbour, is a flat coral island about half a mile in diameter, $2\frac{1}{2}$ miles south-eastward of fort St. Sebastian ; it is very low, without trees, and is not visible from deck until within 5 miles ; there is a square lighthouse on the eastern side, and a white conical beacon on that extreme of the island. The island is encircled by a reef except near its north-west extreme. This reef extends a quarter of a mile off the north-east point, and rather more from the north-west point, in a south-west direction. In the North channel the flood tide sets towards St. George island reef. *See light, page 240.*

St. Jago island (De Sena) is about the same size and description as St. George island, but, being wooded, is visible at a greater distance. It lies about $1\frac{1}{2}$ miles south-westward of St. George, with a passage between of about one mile in width, with depths of 7 to 10 fathoms. The island is surrounded by a reef which, in places, extends to a distance of 3 cables.

Coral knolls.—There are three coral knolls, named A, B, and C, in the outer bay of Mozambique, within St. George island, with depths of $2\frac{1}{2}$ to $2\frac{3}{4}$ fathoms; and a patch of $4\frac{1}{2}$ fathoms, at 3 cables northward of C, close northward of which is the fairway of North channel. B and C lie near the fairway of South channel.*

Tree island or Sete Paus (fully described on page 243), to the northward of the entrance of the harbour, may be known by its having straggling trees on its north-east extreme, none elsewhere. The two islets southward of it have no trees.

Harpshell spit is the south-west extreme of the foul ground which surrounds Cabecinha point, the north point of entrance to the harbour, the shallow water extending nearly $1\frac{1}{2}$ miles from the point. At low water it shows plainly, and can be traced at times by the eye even at high water, but in the absence of the buoys it would be dangerous. The harbour authorities state that the spit extends farther to seaward during continued southerly winds.

St. Sebastian spit projects a quarter of a mile eastward of the fort. At low water this spit is clearly visible and often dry.

Leven bank, in Mozambique harbour, is about 7 cables in length, 5 cables in width, and with a least depth of $1\frac{1}{2}$ fathoms; it forms the north side of the harbour, and reduces the anchorage limits for moderate draught vessels to the width of about one cable. Its probable eastern limit lies about 3 cables N.N.W. of fort St. Sebastian.

MOZAMBIQUE ISLAND AND CITY.—Mozambique island, on which stands the city, is formed of coral, low and narrow, and about $1\frac{1}{2}$ miles long. It lies nearly mid-way between, and just within the line connecting the headlands of Cabeceira and Sancoul; but the only ship channel to the harbour leads eastward of the island, where, in the narrows, between San Sebastian and Harp-shell spits, it is less than 3 cables wide.

Mozambique island is covered with stone buildings; the streets are fairly wide and well kept. The Governor General's palace is an extensive building, and in front of it there is a wharf.

* Mr. Luke, master of H.M.S. *Boscawen*, endeavoured to find C patch, but without success, and is of opinion that it does not exist.

The population (1885) of Mozambique may be about 8,000, including the garrison about 200, Arabs, Banians, and negroes. There are but few Portuguese except those holding official positions, and no British merchants. The natives live outside the town proper ; their houses are well built, thatched and numbered.

Forts.—St. Sebastian fort is the most prominent feature on the island. It was built in 1508–11 by the Portuguese, and is of a quadrangular form, nearly 70 feet high. None of the guns exceed 18-pounders in size. *See lights, page 240.* Lorenzo fort is built on a small isolated rock off the south-west extremity of the island, to which at low water it is joined by a coral flat.

Position.—St. Sebastian fort flagstaff is in lat. $15^{\circ} 0' 45''$ S., long. $40^{\circ} 44' 45''$ E.

Telegraph.—Mozambique is connected with Cape Colony by submarine cable, viâ Natal, and with Aden viâ Zanzibar. For Mails *see page 8.*

Landing.—Landing may be effected in boats at the wharf in front of the Governor General's, except at near low water springs. There is a small jetty in front of the Custom house, with still less water.

Supplies.—Fresh beef, vegetables, and bread are procurable in moderate quantities. Fowls, oranges and other fruits are plentiful. There is a good general hospital.

Water.—There is a Government water tank, with pump, which can be borrowed by applying to the guardship ; the tank is filled by the prisoners at San Sebastian fort. There are other watering places for the use of the town and merchant vessels ; water is brought alongside for about two dollars a ton.

Coal.—From 800 to 1,000 tons of coal are usually in stock at Mozambique. Coal is brought alongside in lighters ; labour is plentiful, but delay may be caused in loading the lighters, as they cannot lie at the wharf at near low water. The assistance of a steam cutter to tow the lighters will expedite coaling.

Repairs.—Coasting craft of small burthen are built here, and vessels may be repaired, chiefly by negro workmen, with the timber of the country ; there is a Government factory for repair of machinery, but only those of the smallest kind can be executed. There are no docks.

Trade.—The articles exported are :—Ivory, calomba root, oil seeds, india-rubber, wax, gold (from Sofala) in small quantities, ambergris, amber and grain. The imports are principally cattle, rice, cotton goods

of all descriptions, and powder for barter with the natives. The value of the exports in 1885 amounted to £226,000, and the imports to £310,000. 720 vessels entered the port, of the aggregate tonnage of 94,000. Trade is not brisk, owing chiefly to the restrictions and heavy Custom house duties, and also to the extreme unhealthiness of the port.

Climate.—The climate of Mozambique is unhealthy. Fevers, malarious and bilious, are prevalent, against which the best precautions are temperate living and abstinence from alcoholic stimulants. Winds, *see* page 242.

Rain.—The rainy season is from November to March; *see* page 20.

LIGHTS.—From a square tower, painted white, on St. George island is exhibited, at an elevation of 66 feet above high water, a *fixed* white light, visible in clear weather from a distance of 15 miles.

Leading lights.—Attached to the flagstaff of fort St. Sebastian is an iron scaffolding, from which, at an elevation of 42 feet above high water, is exhibited a *fixed green* light, visible in the direction of the bar from a distance of 4 miles. At the distance of 605 feet, N. 63° W., from the light at the flagstaff, on the west side of the fort, is a similar *fixed green* light, elevated 69 feet, and visible 4 miles. These lights in line lead through North channel.

At Cabeceira Grande, from a turret near a white house, is exhibited, at an elevation of 35 feet above high water, a *fixed red* light, visible 5 miles. A *fixed red* light is exhibited from the red and white beacon on Harpshell sands, at an elevation of 11 feet above high water, and is visible in the direction of the bar about 5 miles. It is situated S. 13° E., distant $1\frac{8}{10}$ miles from Cabeceira Grande light. These *red* lights in line, bearing N. 13° W., lead between Sebastian and Harpshell spits.

Two *green* lights, 19 feet above high water, are also shown from the custom house pier.

Buoys and Beacons.—Red buoys mark the extreme of the north-east spit of St. George island, the north-east spit of St. Jago and the north extremity of St. Sebastian spit. Black buoys mark the west spit of St. George island, the two Harpshell spits, and the south edges of Leven bank; a small black buoy with beacon lies about 2 cables within the eastern edge of Leven bank. A red and white beacon (*see* lights) stands near the edge of Harpshell sands, at $1\frac{2}{10}$ miles N. $\frac{1}{2}$ E. from fort Sebastian flagstaff.

On entering Mozambique harbour, the black buoys should be left on the starboard hand, and the red buoys on the port hand.

Too much reliance must not be placed upon the buoys maintaining the positions shown on the charts.

Pilots.—When proceeding into Mozambique, a pilot may probably board the vessel some distance inside St. George island, but by attention to the directions the pilot's services may be dispensed with.

DIRECTIONS.—On account of the strong current off Mozambique, which usually (though not always) sets to the southward from 2 to 4 knots an hour, vessels should make the land well to the northward, especially during the northerly monsoon; and in the event of a sailing vessel being swept to the southward of her port, she should at once stand to the eastward for 60 miles or more, and regain her northing beyond the influence of the southerly current.

Vessels of large draught should use the North channel only.

North channel.—If approaching from the northward, keep the south-east side of St. Jago open eastward of St. George island, to avoid the reefs off cape Cabeceira and Tree island, and when fort St. Sebastian flagstaff bears N.W. by W. $\frac{1}{2}$ W., steer for it, passing about a quarter of a mile northward of the red buoy on St. George spit, and leaving the black buoys on the starboard hand. When the red and white beacon on the Harpshell sands is in line with a large white house on Cabeceira Grande, or with Cabeceira light structure (but it is not easily seen) bearing N. by W. $\frac{1}{2}$ W., steer for it until the custom house pier comes in sight, when the course should be gradually altered to the westward, steering for the outer end of the custom house pier bearing W. by S. $\frac{1}{2}$ S., until abreast of fort Sebastian, thence about W. by S. a short distance, anchoring as convenient. In going through the narrows abreast the fort, be quick with the helm, and make due allowance for the tide, which runs strong. The flood sets towards Leven bank.

A sailing vessel becalmed may anchor in North channel in depths of 6 to 12 fathoms, coral bottom; but there are many deep holes within one mile of fort St. Sebastian.

At night, when about one mile seaward of St. George island light, bring the two *green* lights on fort Sebastian in line, bearing N. W. by W. $\frac{1}{2}$ W., and steer for them until Cabeceira and Harpshell *red* lights are coming on, when haul up for them. These red lights in line, N. by W. $\frac{1}{2}$ W., will then lead between Sebastian and Harpshell spits, and when the *green* lights on the end of Custom house

pier come in sight, gradually haul to the westward, steering for them when bearing W. by S. $\frac{1}{2}$ S. until abreast the fort, when anchor as convenient.

South channel is only suitable for light draught vessels, on account of the $2\frac{1}{2}$ and $2\frac{1}{4}$ -fathom coral knolls lying near mid-channel, which are not buoyed. When approaching from the southward, avoid the indraught on the flood into Mokambo bay, thence keep Tree island open eastward of St. George until St. Sebastian light or flagstaff bears N.W. by N. northerly, when steer for it until Cabeceira light bears N. by W. $\frac{1}{2}$ W.; then proceed as for North channel.

Pao mountain on with the centre of fort St. Sebastian is said to lead between the two coral knolls above mentioned.

Anchorages.—The usual outer anchorage is south-eastward of fort St. Sebastian, in 7 or 8 fathoms, with the flagstaff on fort St. Sebastian bearing N.W., distant about three-quarters of a mile, and Tree island just open of cape Cabeceira. Here a vessel will be out of the strength of the tide, which runs with considerable force through the narrows and North channel. There are several deep holes in the outer anchorage, which has not been accurately sounded, and care is necessary when bringing up.

In taking up a berth in the harbour, keep near Mozambique island, to avoid Leven bank, the nearest part of which is but 3 cables from the island.

Abreast the fort, the channel for large vessels is but 2 cables wide.

A good position, in about 5 fathoms, and 2 cables from the shore, is with the outer end of the Custom house pier S.W. $\frac{1}{2}$ W., and fort St. Sebastian flagstaff S.E. $\frac{1}{2}$ E.

Considerable alteration is said to have been caused by the rapid tides which run in Mozambique harbour, and there is supposed to be about 3 feet less water than is shown on the chart.

Tides.—It is high water, full and change, at Mozambique at 4h. 15m.; springs rise 12 feet. The tides run strong in the harbour—the flood to the westward, the ebb to the eastward—and with sufficient strength at springs to turn the ship against a strong sea breeze.

Winds.—The prevailing winds on the coast about Mozambique are northerly from October to April, and from the southward during the rest of the year. At Mozambique, land and sea breezes prevail; the latter coming in about 10h. or 11h. a.m. from S.E. to South, shifting towards east in the afternoon. At daylight, the land wind blows right out of the harbour.

Cyclones are experienced occasionally, but at rare intervals. About the latter end of January of the years 1841-2-3, Mozambique was visited by cyclones. At one of these periods the vessels drove from their anchors and were stranded. From the description of those who witnessed them, the bottom of the sea was agitated to such a degree as to heave and loosen the sand, rendering it impossible for the anchors to hold. Black impenetrable clouds overhead produced a darkness as during an eclipse. Previous to those visitations, cyclones had been unknown for 40 years.

Another cyclone occurred on April 1st and 2nd, 1858, on which occasion the barometer fell to 28·7, and seven out of ten vessels at that time in the port were driven on shore; much damage was done on the island of Mozambique and surrounding country. *See cyclones, pages 15, 16.*

Mossoril bay is a fine harbour, within and north-westward of Mozambique island, about $2\frac{1}{2}$ miles long by $1\frac{1}{2}$ wide, with depths of from 4 to 7 fathoms, and capable of containing a large fleet; but it has only been partially sounded.

The north-west part of Mossoril bay branches off into three creeks. The northern one, Mossoril creek, extends to the isthmus of Empassa, which only separates it from port Conducia by the distance of half a mile. There is a road of communication for the convenience of trading vessels lying in Conducia.

The western creek branches into two, Calombo on the west, and Lombu on the south. The shores of all these creeks are covered with mangrove.

THE COAST.—Cape Cabeceira, a low bluff cliff with trees on it, is the south-eastern extremity of the Cabeceira peninsula; an extensive submerged coral flat surrounds the cape and the coast northward and westward; this flat extends in some places nearly 2 miles from shore, embracing the Tree islands, and scarcely anywhere less than one mile as far as Conducia bar. The coast gradually rises to cape Conducia, with a sandy beach the whole way.

Tree island, or Sete Paus, is the northernmost and largest of three islands, situated on a sand-bank two miles in length in a north and south direction, and just covered at high water, at $1\frac{1}{2}$ miles eastward of cape Cabeceira, and about one-third of a mile within the edge of the coral reef before mentioned.

This reef extends $1\frac{1}{2}$ miles southward of the southern and smallest islet, there forming the northern boundary of the north channel into Mozambique.

Tree island has straggling trees on its north-east extreme, none elsewhere. The other two islets of the group have no trees.

Cape Conducia, the north-east extremity of the peninsula of Cabeceira, is cliffy, and is about 200 feet high; the coast on either side is low and sandy.

Between Tree island and Conducia bay the soundings shoal gradually on approaching the shore reef.

CONDUCIA BAY and the port at its head are separated from Mozambique harbour, by the peninsula of Cabeceira.* The entrance of the bay is 6 miles wide between Kitangonia and Tree islands, with deep water between. The inner part of the bay, which is the usual anchorage, has a navigable channel of about $1\frac{1}{2}$ miles wide between Sombrero islet and cape Conducia, 3 miles apart, from whence the bay extends about 6 miles westward to Bar point, with irregular depths of from 20 to 5 fathoms. The soundings are more regular towards the head of the bay, decreasing from 11 to 5 fathoms within half a mile from the north shore. Kissangula or Sombrero is a rocky islet with trees in the centre.

The anchoring ground in the bay is much reduced by sand and coral flats all along its south side, which extend more than one mile off-shore between cape Conducia and the entrance to the port, leaving a passage with about 4 fathoms water, between its northern extremity and the shallow water surrounding Bar point. From Sombrero islet the shoal ground extends southward $1\frac{1}{2}$ miles; and there is a $3\frac{1}{2}$ fathom patch, near mid channel, with Sombrero islet bearing E. by N., and cape Conducia S. $\frac{1}{4}$ E. Along the north shore the rocks and shallow ground extend off about half a mile.

Port Conducia, at the head of Conducia bay, is a land-locked harbour, one mile long by half a mile wide, within Bar point, with about 4 fathoms of water.†

Conducia river, of which the port is the estuary, has its source in Table mountain, and is navigable for boats almost to the foot of the mountain.

Bar point is a dry narrow spit of sand with some shrubs on it; there is a narrow passage with 10 fathoms water between it and the south shore.

Directions.—Having made the land to the northward of Kitangonia, on account of the probable southerly set of the current, coast

* See plan of Conducia bay, No. 653; scale, $m = 0\cdot8$ of an inch.

† "Province of Mozambique," Lisbon, 1884.

as close as convenient and haul round the south point of Kitangonia at the distance of three-quarters of a mile, and steer W. by S. $\frac{1}{2}$ S. for cape Conducia, which is the north-eastern cliff of the peninsula of Cabeceira ; when the two little points (which are the only rocks to the westward of Sombrero islet) bear N. by W. $\frac{3}{4}$ W., and Table mountain is open to the westward of them, steer N.W. $\frac{1}{2}$ N. and coast the northern shore if wishing to go farther in. Sombrero island on with Kitangonia point appears a good mark for running up the bay until Arab islet on the south shore bears about S. by E.

If proceeding into the port without a pilot, proceed carefully along the northern shore, with the boats ahead sounding, until near Bar point ; here the channel is tortuous, but there is not less than 4 fathoms in mid-channel.

In entering Conducia bay from the southward, round Tree island as close as convenient, and steer for Table mountain just open to westward of the two little points bearing N. by W. $\frac{3}{4}$ W. ; and when cape Conducia bears W.S.W. distant $1\frac{3}{4}$ miles, steer about N.W. $\frac{1}{2}$ N., and proceed as before.

Do not approach Sombrero islet within $1\frac{1}{2}$ miles, as the water shoals very suddenly.

Anchorage.—There is a good anchorage in the entrance, in 11 fathoms, with cape Conducia S. by W. and Sombrero Island E.N.E. ; and farther up the bay, in 5 fathoms, mud, with Sombrero island bearing East, and cape Conducia S.E. by E. $\frac{1}{2}$ E.

Supplies.—There was in April a running stream at the rocky points north-westward of Sombrero, but watering was hard and slow work, as the water had to be carried to the boat in baricoes, the shore being shallow for a long distance out ; at high water there was less difficulty.

Fowls, eggs, and oysters, will probably be obtained from the natives. Near Bar point salt works have been constructed westward of cape Choca (Conducia ?), from whence it is shipped to various places.*

Tides.—It is high water, full and change, at port Conducia at 4h. 15m. ; springs rise 12 feet.

THE COAST.—Kitangonia (Namalunga) island is about two miles in length, north-east and south-west, by one mile in width. It forms the northern limit of Conducia bay, and may be approached on its eastern side to a prudent distance.

* Owen.

Port Velhaco, formed on the west side of the point of that name, and protected to the southward by Kitangonia island, is better sheltered than Conducia bay from the strong north-west winds, which blow in the latter end of the northerly monsoon. The port appears not to have been examined, but there is a depth of 4 fathoms in the entrance, between Velhaco point and the island.*

Kroosi is a large and populous village situated on the mainland, between the islands of Kroosi and Napenja. Coasters find perfect shelter within the outlying reef (which must be crossed at high water), abreast the town, lying aground on the sand.

The coast from Kroosi village takes a northerly direction for about 14 miles to Kisima-Julu harbour, backed by ranges of hills at 2 miles distant. Janga village, on the point of the same name, lies about midway.†

Kisima-Julu harbour.—About 18 miles southward of Fernando Veloso bay is the harbour named Kisima-Julu. It is much visited by coasters engaged in the timber trade, which constitutes the chief wealth of the adjacent district. From the entrance, which is about one mile wide, it extends in a north-west and west direction about $2\frac{1}{2}$ miles, thence in a south-west direction about 3 miles. The entrance channel between the reefs is about 200 yards wide, with a depth of from 3 to 4 fathoms, and in the harbour, which is about one mile wide, the depths are from 4 to 8 fathoms. As this harbour has not been surveyed, caution is necessary when entering.

Cape Melamo (Kulumlomu), the southern headland of Fernando Veloso bay, is low, bluff, and rocky, and appears to be steep-to. About 2 miles southward of the cape the cliff terminates near some conspicuous casuarina trees, thence the coast, about 300 feet high, is fronted by a high sandy beach, nearly to the entrance of Kisima-Julu river. Off this beach, shoal water appears to extend about 3 cables.

FERNANDO VELOSO (Mazazima) BAY is a spacious but little frequented bay, about 40 miles northward of Mozambique, with port Nakala at its south-west, and Belmore harbour at its north-west corner. The bay is about 6 miles across, between capes Mocuo and Melamo, and about 8 miles deep.†

* Owen.

† See Admiralty chart :—Mozambique harbour to Ras Pekawi, No. 1,809, with sketch of Fernando Veloso bay.

Foul ground, reported by H.M.S. *Vulture*, 1874, is charted for about 3 miles off cape Mocuo ; on the southern side, a ledge, which dries at low water, extends about half a mile from shore, with from 7 to 8 fathoms at a short distance. The centre and head of the bay has no bottom at from 20 to 40 fathoms. It is advisable to keep the southern shore aboard when entering or leaving the bay.

The land at the head of the bay is moderately high, with some hummocky hills, and north-westward of the bay are some remarkable saddle hills and a sugar-loaf peak.

On the northern side of the entrance, within cape Mocuo, there is a very remarkable high hill, with a rather flat top, rising abruptly from the land beneath, which is level, and of moderate elevation. This is probably Loguno, Nrogi, or Kobe peak, on the chart.

When seen from the northward at a distance of about 15 miles, this hill resembles a vessel under sail so closely as to deceive even an experienced eye, but, on a nearer approach and different bearing, it changes its form.

Anchorage.—H.M.S. *Mutine* (1846) anchored in 8 fathoms about 4 miles within cape Melamo, and one mile off the southern shore, abreast of a small stream.

Water.—The *Mutine* watered with her own boats from the stream abreast of her anchorage, obtaining 12 tons per day, but it was rather difficult to procure.

Supplies.—Fowls, goats, ducks, and vegetables are to be obtained in abundance ; also guinea fowls, venison, and a species of hare, but it requires some little time before the natives acquire confidence to bring the supplies from a distance. Wood is plentiful, and easily obtained in any part of the bay.

Tides.—The probable time of high water, full and change, is about 4h. ; rise about 15 feet.

Port Nakala.—The result of an exploration of the south-west corner of Fernando Velosa bay, formerly known as Fernando Velosa river, by Lieut. H. O'Neill, H.B.M. Consul at Mozambique, has been the discovery of a capacious and landlocked harbour, named port Nakala. From Nahareni, the eastern point of entrance, it extends a distance of about 9 miles in a S.W. by S. direction, with an average breadth of $1\frac{1}{2}$ miles. The entrance is about half a mile in width, with deep water on the eastern side, but a shoal extends nearly half way across from the western point.

Its eastern shore rises in steep but well-wooded slopes to 100 or 200 feet, with bold promontories, suitable for settlements, catching every

prevailing breeze over a clear sweep of several miles of water, without a trace of mangrove swamps. There are some remains of the fortress of Don Miguel, on Nahareni point, erected early in this century.

Off Namuhashi point, on the western side of the port, 10 miles within the entrance, are the Shihubidi rocks, covered at high water springs, and connected to the shore by a reef. The water shoals gradually as the head of the port is approached, and foul ground extends a considerable distance off Namusu point. There appears to be no difficulty in entering this port.

This used to be a great rendezvous for slavers, vessels being able to lie perfectly unseen from seaward, either here or in Belmore harbour to the northward.

Belmore (Nihegehe) harbour, at the north-west corner of Fernando Veloso bay, is said to be, at times, difficult to enter, as the discoloured water, caused by the fresh water from a stream at the head of the harbour renders the reefs difficult to be seen; the tides also run strong, but there is plenty of water in mid-channel.

The harbour is about 4 miles in length, by one mile in breadth throughout; the entrance channel is apparently reduced by reefs fringing the points to a breadth of 2 or 3 cables, with no bottom at 20 fathoms. Within the entrance, the depths decrease gradually from about 16 fathoms towards the head of the harbour.

The east shore of the harbour is mostly rocky, with sandy patches, until northward of West cove, when it is mangrove swamp to the head. The west side is mangrove swamp with the exception of a sandy bight just within the entrance, and is a good seining ground. Shoal water extends from the mangrove points on the west side about a quarter of a mile.

H.M.S. *Vulture* anchored off West cove in 7 fathoms, not quite half a mile from the west shore. Directly opposite this cove is a village, where a small supply of vegetables and fowls were obtained; but the inhabitants appeared very poor.

There is no trade in Belmore harbour, and the locality does not seem to be healthy.

COAST.—Pinda shoal.—From Fernando Veloso bay to cape Loguno, little is known of the coast, as it is generally given a wide berth, on account of Pinda shoal, which extends 5 miles from the coast; the sea generally breaks on all parts of it, but we have no definite information as to its extent north and south; the north-east edge of the reef appears to be about East from cape Loguno, and its southern end (towards which are several patches of green water, which do not always break), south-east or south of cape Mocuo.

The east point of the entrance of Belmore harbour bearing West, and in line with a high hummock or round-topped hill, appears to lead just southward of Pinda shoal.

Cape Loguno (*Ras Mwamba Koma*) is the southern headland of Memba bay. It is of moderate height, about 80 feet near the sea, level at the top, with perpendicular rocky cliffs. It appears to be bold-to on the north side, but bordered eastward by Pinda shoal.

MEMBA BAY (*Mwendazi*) is about 6 miles wide, between capes Loguno and Tapamanda (*Ras Umlulu*), and perhaps 7 or 8 miles deep, with no bottom at 50 fathoms, in its outer part; its north-western arm is said to afford good and sheltered anchorage, but it has not been examined. The little we know of Memba bay is principally from H.M.S. *Nerbudda*, which vessel touched slightly on a coral reef at high water, going from 60 fathoms suddenly into $2\frac{1}{2}$ fathoms, but no further particulars are given. This reef extends from the north side of the bay apparently $1\frac{1}{2}$ miles, and as the account mentions that it was high water, it is probable that at times the reef is uncovered.

The *Nerbudda* appears to have anchored abreast of the mouth of the river Tembo (*Mkubure*) in 12 fathoms, at about one mile from the north shore, and one mile or more westward of the reef she touched on. From this anchorage to the head of the bay, sand flats border the shore, extending a considerable distance in some places.

Bocage harbour is an inlet about 3 miles in length, by one mile in width, on the south side of Memba bay. Near the entrance there is no bottom at 60 fathoms; the depths in the harbour are said to be convenient for large vessels. This was formerly known as Umkombari river.*

Marenje is a port and village of some importance to the coasting trade, situated about 2 miles northward of Memba bay.

COAST.—Landmarks.—From Memba bay to Sorisa point, a distance of about 37 miles, the land is more striking than any other part of the coast. It is generally level and of moderate elevation, about 200 feet, decreasing towards the coast where it is low. From the level land, between latitudes $13^{\circ} 45' S.$, and $14^{\circ} 0' S.$, several high craggy peaks, known as the Sorisa range, and which Owen justly compares to the ruins of some giant city, rise abruptly to a height of 2,000 or 3,000 feet; these peaks assume every variety of form of sugar-loaf, cone, and round or square topped pillars, in some cases appearing to overhang from their bases. From Almeida bay to cape

* Lisbon, 1884.

Tapamanda, H.M.S. *Brisk* stood along shore at a distance of 2 or 3 miles ; it appeared to be free from reefs and tolerably bold-to.

Sangone (Simuku) bay, about 10 miles northward of Memba bay, in about lat. $13^{\circ} 58' S.$, is about one mile deep, with an entrance half a mile wide. The entrance appears to be free from reefs, but though considered a good port by coasters, a number of reefs are exposed at low water, greatly limiting the anchorage space, and rendering it probably unsuitable for larger vessels.

The village of Simiku is scattered over a space 2 miles in extent. A considerable trade is carried on here by Banians, in amendoim, columba, wax and rubber. The port is the principal outlet for the trade of the district under the chief of the Makua tribe.

ALMEIDA BAY is formed by Mancabale and Indujo reefs, which make it a safe and commodious anchorage, with from 4 to 7 fathoms water. The main channel to Almeida bay is southward of Indujo reef, between which and the coast, the depths vary from 8 to 10 fathoms.* There is also a passage a quarter of a mile wide, between Indujo and Mancabale reefs, with a depth of 11 fathoms in the centre, decreasing gradually towards the anchorage. Two remarkable peaks bearing W. $\frac{1}{4}$ N., and just open southward of the sandy hill on the western shore, lead through.

Mancabale reef, dry in places at low water spring tides, skirts the eastern face of the low and sandy point Sorisa, at a distance of one mile, and projecting 5 miles to the southward, protects the anchorage of Almeida to the westward of it. From a position about half a mile outside the reef, a depth of 14 fathoms was found.

Indujo reef, about one mile in extent east and west, and awash at low water springs, lies one mile southward of Mancabale reef, leaving a ship channel a quarter of a mile wide between the two.

Minsangegy river (Chahundi) lies in the southern part of Almeida bay. The hill just southward of the river is a conspicuous bluff, and a useful mark for the bay.

LURIO BAY, between Sorisa and Pando points, a distance of about 8 miles, has from 5 to 15 fathoms water. It affords sheltered anchorage under Sorisa point during the south-west monsoon period, but none during the north-east monsoon ; there is an easy overland route from Almeida. The land is all low near the sea, with thick jungle, but there are high craggy peaks in the interior.

* Owen. See plan of Almeida bay, scale $m = 0\cdot5$ inch, on Admiralty chart, No. 1809.

Lurio river is in the southern part of the bay : the sea at times is discoloured by its water for some miles. Lurio is the principal settlement between Mozambique and Ibo.*

COAST.—Northward of Lurio bay the land is of moderate height and continues so from Badgley point to Maunhane point, a distance of about 25 miles.

This part of the coast is fronted in places by a quicksand beach, and a reef which extends in places about $1\frac{1}{2}$ miles. This reef is steep-to, there being no bottom at 15 fathoms close to, in one place at least. Northward of Xanga Mrebwi there is temporary anchorage in about 11 fathoms, sand over coral, not good holding ground.

Mkufl.—The bar of the river and port of Mkufl, 10 miles northward of Lurio bay, may be crossed at half tide by craft drawing from 5 to 6 feet, and close under the southern shore there is anchorage for such craft in from 2 to 3 fathoms. The village is clean and healthily situated on elevated ground on the right bank, and provisions and good water are obtainable.

Xanga Mrebwi (Ushanga) is a village situated about 6 miles southward of Maunhane point ; abreast it there appears to be a gap in the reef with a deep water channel. The land about Ushanga is low, with trees almost to the water's edge.

It was about here that H.M.S. *Pantaloone* got on shore in 1862, remaining on the reef 7 days, and narrowly escaping becoming a total wreck. She was endeavouring to pick up an anchorage after dark on the bank off Maunhane point, but being a few miles to the southward she went from no bottom at 15 fathoms, on to the reef without obtaining soundings. There appears, therefore, to be a deep spot outside the reef, just where she unfortunately grounded, as the ship, after being floated, was anchored in $5\frac{1}{2}$ fathoms, and subsequently moved off to 11 fathoms.

Maunhane point is rather bluff, but terminating in a low rocky point, from which the reef extends eastward two-thirds of a mile. The sea breaks upon this reef, and it is also visible from the discolouration of the water.

POMBA or PEMBA BAY (Mwambi).—The entrance to Pomba bay, about 5 miles to the westward of Maunhane point, is about $1\frac{1}{4}$ miles across between North and Herbert points. The basin inside these points is one of the finest harbours on this coast, being about 8 miles north and south, by 5 miles deep, with sufficient water

* Consul O'Neill's Report, 1880.

in most parts for heavy draught vessels, and shelter from all winds.* The country around is composed of fertile plains and woods, and the climate is said to be good in comparison with other places on this coast. See climate at Ibo, page 257. The land wind generally blows out of the bay till 7h. or 8h. a.m. There is good fishing with the seine.

North or Sid-Ali point is a moderately high bluff, covered with trees and jungle, and steep-to, there being a depth of 18 fathoms within 100 yards of it.

Herbert or Miranembo point, the southern point of entrance, runs off low, but with a high hill at the back : it may be approached within a quarter of a mile. There was formerly a fort and flagstaff on the point.

From Herbert point the shore trends westward $1\frac{1}{2}$ miles to Mpira or Sandy point, off which shoal water extends about 4 cables.

Outlying Dangers.—The shores of Pomba bay appear to have numerous projecting rocky ledges to the distance of $1\frac{1}{2}$ miles in places, and not to have been fully examined, but the principal dangers to vessels entering the bay are as follows :—

Mutine patch, of coral, one cable in extent, with 3 feet least water, and from 12 to 14 fathoms around. It lies with North point bearing E. $\frac{1}{2}$ S., and Herbert point S.E. by E.

A coral patch, one cable in extent, with 6 feet water, discovered by H.M.S. *Mutine*, lies about one mile southward of Mutine patch, with Mpira point bearing S.E. $\frac{1}{2}$ S., $1\frac{1}{10}$ miles.

Penguin shoal, a patch of coral about 40 yards across, with 4 fathoms at low-water springs, lies about midway between the Mutine patches.

Pantaloons patch, of 5 fathoms, in the northern anchorage, lies with Mpira point bearing South, and the beach near Mwambi village N.W. by W. $\frac{1}{2}$ W.

Two detached patches, with about 6 feet water, lie half a mile offshore, eastward of Pantaloons patch.

Directions.—Anchorage.—Outside Pomba bay there is no anchorage, except on Imbo bank, hereafter mentioned. Between the points of entrance the depths are from 30 to 40 fathoms, and not less than 20 fathoms until 2 miles within the points.

To proceed to an anchorage in the northern part of the bay, and

* See Admiralty chart :—Mozambique harbour to Ras Pekawi, No. 1809, with plan of Pomba bay.

being abreast of North point, distant half a mile, steer N.W. by N. for about $2\frac{1}{2}$ miles, midway between Pantaloons patch and the shoals one mile eastward of it, and anchor in 9 or 10 fathoms, black mud and good holding ground, with Mpira point S. $\frac{1}{2}$ W., and the sandy beach near Mwambi village W.N.W.; the latter leads northward of Pantaloons patch, with which bearing a vessel may go nearer the village.

If proceeding to an anchorage in the southern part of the bay, give Mpira point a berth of three quarters of a mile when bearing about E.S.E., to avoid the reef extending from it. There is anchorage in about 12 fathoms, with Mpira point bearing N.E. distant $1\frac{1}{2}$ miles; southward of this the chart states that the ground is reported foul.

The western side of Pomba bay is also foul, the shallow ground extending off nearly 2 miles.

Supplies.—Bullocks are to be obtained in small numbers, also poultry and vegetables; and wood may be cut here. Deer and other game are plentiful in the vicinity.* The village of Mwambi, in the north-west part of the bay, consists of a few huts inhabited by Arabs; another village to the southward is under the dominion of a native chief. Besides Arabs, the inhabitants of Pomba bay are Banians and natives, and a small detachment of Portuguese troops. In 1857, some colonists were sent from Portugal to a place called Munguete, about 3 miles inland.

Water.—Accounts differ as to the practicability of watering vessels at Pomba bay, but the general opinion appears to be that water can only be obtained in small quantities. There are, however, two inconsiderable streams in the north-east part of the bay, which are barely navigable for boats, and a larger one named the Nihegi, in the south part of the bay.

Tides.—It is high water, full and change, at Pomba bay at 4h. 15m.; springs rise 15 feet; neaps rise 11 feet; neaps range 7 feet.

Imbo bank, in the approach to Pomba bay, and $2\frac{1}{2}$ miles north-east of Maunhane point, is said to afford good anchorage in 10 fathoms, with North point (Sid Ali) bearing about W. by N.

The COAST from Pomba bay northward continues moderately high for about 15 miles, when it becomes low and thickly covered with trees for 8 miles to Kiziva island; there is, however, high land in the interior of Arimba, which may be seen in clear weather from a distance of 40 miles.

* Commander Hope, R.N., 1845.

Dedima bay, about one mile in extent, with a depth of 3 feet only between its entrance points, is situated in about lat. $12^{\circ} 43' S.$ It must be approached with caution. Mugarumo river entrance lies in its north-west corner.

ARIMBA HEAD, about 4 miles northward of Dedema bay, is a peninsula, and forms the north-east side of Kipáo bay, an inlet about 2 miles in extent, with depths of from 3 to 5 fathoms of water. Kipáo island, on the north side of the entrance, is connected to Arimba head by a reef. Arimba head when seen from the north-eastward is conspicuous, having six or seven hillocks on it.

The channel to Kipao anchorage appears to be nearer to Kipáo island than to the main, the reef extending some distance from Sito point; a detached patch of 3 fathoms, lies about three-quarters of a mile eastward of the point.

Port Arimba, on the north side of Arimba head, is protected by Kiziva island and reef. Between the island and Arimba head there is a depth of from 5 to 3 fathoms in the channel leading to the anchorage.

Port Arimba appears to be a secure harbour for small vessels. It is one of the Portuguese settlements. In 1859 it had about 400 inhabitants; exports grain, vegetable, fruit, and timber.* Arimba fort stands on the shore in the south-western part of the anchorage.

KERIMBA ISLANDS.—The Kerimba or Aswatada islands extend from Arimba head to cape Delgado. These two headlands are nearly in the same meridian, and 117 miles apart. In this space the outer reefs and islands extend in some places as much as 13 miles from the main land, and in most parts more than 10 miles, but to the southward of lat. $12^{\circ} S.$ they nowhere exceed 8 miles.

The Kerimba islands are generally low, well wooded and easily seen from seaward; some have a diversified surface of hill and dale, whilst many are mere corallites.

The main land abreast Kerimba islands is also generally low, and will rarely be seen when coasting outside the reefs; this, and the fact that the sea faces of the reefs are steep-to, necessitates caution in approaching this part of the coast, even in the day time. This observation applies generally to the coast between Mozambique and lat. $3^{\circ} S.$ Convenient depths for anchoring will generally be found between them.†

* Statistics of Portuguese Possessions.

† Owen.

There are eighteen or nineteen openings through the outer islands and reefs into a still greater number of secure ports or convenient anchorages.

Fumo island, situated about 6 miles northward of Arimba head, is connected with Kiziva by a coral reef, and the two islands together form the eastern side of a well-sheltered but rather shallow anchorage, a continuation of port Arimba, from which direction is the only entrance, the passage between Fumo and the main being only a boat channel. Fumo is one of the islands which the Portuguese inhabit; it had in 1859 a population of about 100.

Penguin island, to the northward of Fumo, is small, wooded, and fronted by a reef to the distance of half a mile.

There appears to be temporary anchorage off Penguin island reef, in 13 fathoms, coral bottom, with the south point of the island bearing N.W. by N. distant three-quarters of a mile, and the south edge of Samucan reef bearing East. There are depths of about 14 fathoms near Samucan reef, but the water deepens suddenly at a short distance southward of it.

Montepes bay, contained between Manangoreshi and Kisanga points, has been but partially examined. There is apparently a deep water channel between the reefs of Fumo and Penguin islands, but a rock lies near midway with a depth of 33 fathoms close-to.

At the head of the bay is the Portuguese settlement of Montepes, in lat. about $12^{\circ} 29' S.$, at the mouth of the river of that name. The village consisted of miserable huts, and it had a population of about 650 in 1859.

Samukan island appears to be connected with Kerimba and with Ibo by the coral bank which fronts and protects Montepes bay, Samukan being the southernmost of the three.

Kerimba island is about 3 miles long north and south by $1\frac{1}{2}$ miles wide; it is low, wooded, has good well water, and is the most fertile of the Archipelago. Kerimba was formerly the capital of the district. Its trade at the time of Owen's survey was only in slaves. In 1859 it had a population of about 200 of all denominations.*

Kisanga point is a projection of the main land towards Ibo island, from which it is separated by a channel scarcely navigable for canoes at low water. Kisanga is one of the Portuguese settlements;

* Statistics of Portuguese Possessions, 1859.

it had about 200 well-constructed wooden houses, and was inhabited by about 2,000 persons.

IBO HARBOUR.—Ibo island is about 5 miles long in a north-east and south-west direction, and nearly divided into two by a deep inlet open to the N.N.W. The town and fort of St. Jo  o are on the north-eastern side of the inlet and near the northern part of the island. This is one of the principal Portuguese ports.

The south-western half of Ibo island is named Kirambo.*

Ibo bluff, the north-east extreme of the island, is moderately high, with a lighthouse, and may be seen from a distance of 14 or 15 miles. Ibo may also be distinguished from the others of this chain of low islands by its white fort, which when bearing about S.W. shows a long front. The cocoa-nut trees in the town are easily distinguished at a distance of several miles.

LIGHT.—From a light tower 20 feet in height on Ibo bluff (Mujaca point) is exhibited at an elevation of 51 feet above high water, a *fixed* white light, visible in clear weather between the bearings of N. $\frac{1}{2}$ E. and S.E. by S., from a distance of 12 miles. Reported uncertain in exhibition.

The Main channel to the anchorage, southward of St. Gonsalo shoal is about one mile wide between the buoys, with depths of 6 to 8 fathoms. The channel northward of St. Gonsalo, between it and Matemo reef, is about half a mile wide, with depths of from 12 to 24 fathoms.

Buoys.—Mujaca shoal bordering the north side of Ibo island extends northward about $1\frac{1}{2}$ miles, and is marked by two red buoys; one on the extreme north of the lighthouse, the other on the extreme north of fort St. Jo  o. Black buoys mark the east and south extremes of St. Gonsalo shoal, and there is a mooring buoy in the anchorage. These buoys are not to be depended on.

St. Gonsalo shoal or Corea de San Gonsalo, forms the north side of the channel into Ibo harbour. It is about $2\frac{1}{2}$ miles long, in an east and west direction, and at low water shows as a dry sand bank.* It may generally be seen either by the discolouration of the water or by the sea breaking.

The Town of Ibo consists of stone houses and huts. The population (1887), composed of Portuguese, Arabs, Banians, and natives, is between 3,000 and 4,000, including the garrison.

* See plan of Ibo harbour; scale, $m = 0\cdot6$ inch, on Admiralty chart, No. 1,809.

Fort St. João, star-shaped and constructed of stone, is garrisoned by a company of infantry. The defence of the town is completed by two other forts, called St. José and St. Antonio, both also of stone.

The inlet which runs up to the town forms a harbour for small craft, having depths of from $1\frac{1}{2}$ to 2 fathoms ; but on the bar, which is about a mile from the shore, there is only three-quarters of a fathom at low water. The upper part of the inlet, for a mile or more in extent, is only a shallow lagoon. Ibo was formerly a great slave dépôt.

Climate.—The sickly season is from the middle of January to the middle of March, during which time there is much rain, with thunder and lightning. The fever at that time of year is fatal, and the negroes are not exempt from it.

Directions.—**Anchorage.**—The channel southward of St. Gonsalo shoal is the usual one for proceeding to Ibo road, between the red and black buoys. From about 2 miles off Ibo light, steer in with the south end of Matemo bearing N.W. by N., until the extreme of Kirambo is well open to the northward of the fort, bearing S.W. by W. $\frac{1}{2}$ W., then steer in W. by N., between the buoys, and anchor in about 5 fathoms, with the fort, or the point on which it is situated, bearing from S. $\frac{1}{2}$ W. to S. $\frac{1}{2}$ E., distant about $2\frac{1}{2}$ miles. Deeper water will be found at 2 or 3 cables farther northward. The anchorage is good, but partly exposed to easterly winds, and the tides run strong.

When entering Ibo, it is well to be guided partly by the eye, as the reefs show well after half ebb, particularly the St. Gonsalo ; borrowing a little on this shoal will therefore ensure safety from Mujaca reef. In case of necessity, vessels may anchor outside the reefs, and also off the edge of the reef joining Ibo and Kerimba. Soundings extend about 2 miles seaward of Matemo, Ibo, and Kerimba islands.

Supplies of fresh provisions are obtainable in small quantities ; water is difficult to obtain, and of indifferent quality. There are no facilities for repairs. Communication, see page 8.

Trade.—The exports are oilseeds, india-rubber, ivory and wax, average value for 1887 £20,000 ; Imports ; guns, powder, beads, cloths, average value £18,000. The export duties are heavy, but imports the reverse. About 10 or 12 vessels enter yearly besides the mail steamers and coasters. Pilotage is compulsory except for men-of-war.

Tides.—It is high water, full and change, at 4h. 15m. ; springs rise 11 feet. The tides run strong through the channel between Mujaca and Gonsalo reefs, the ebb setting rather towards the Mujaca side, and the flood inclining to the northward.

Gramacoma river enters the sea westward of Ibo harbour, Lumbo, a Portuguese settlement, with a population of about 600, is situated at the mouth of this river.

MATEMO ISLAND, next northward of Ibo, is about $4\frac{1}{2}$ miles long, north and south, by $2\frac{1}{2}$ miles broad. It is one of the Portuguese settlements, and has a population of about 100 persons. Of the four inhabited islands, this is the least fertile, and it has no water. This island may be distinguished from Ibo by its being low, with straggling trees along its whole length; by the high white sand beach on its south-east side, and the rocky islet off the south-east point; there is a sandhill about one-third the length of the island from the south end, which shows well when the sun is shining on it.

Ibo is higher, has denser trees, and a cocoa-nut grove on its northern side. The main land to the northward of Matemo is level, and high for this part of the coast, being visible at 16 or 18 miles, and will be seen before Matemo when standing in from seaward.

The coast from abreast Ibo island to Kirinuzi point is moderately high, and higher still from the latter to Pangane point. Inland is a range of hills, visible 20 miles from the coast; the south end of the range is bluff, with a conical hill just to the southward, mentioned later as the mark which leads southward of Das Rolas island. Thence northward to cape Delgado the main land is seldom seen from outside the islands and reefs.

Das Rolas.—This small island lies about $2\frac{1}{2}$ miles northward of Matemo; it is low, and covered with brushwood. A reef extends about one mile north-eastward, and half a mile south-eastward of it. The north-west point is sandy, and affords the best landing.

Anchorages.—Matemo island is a convenient rendezvous when cruising in the vicinity, on account of there being anchorage under it sheltered from either monsoon, and easy of access; the tides, however, run strong. Between Matemo and Envie shoal, which fronts the coast to a distance of 4 miles, there is a channel half a mile broad, with depths of 3 to 5 fathoms.

There is anchorage in about 8 fathoms off the north side of Matemo, distant about $1\frac{1}{2}$ miles, with north extreme of Das Rolas bearing N.W. by W., and west extreme of Matemo S.W.

There is more sheltered anchorage farther in, under Das Rolas, in from 7 to 9 fathoms, with Das Rolas bearing N.E. by N., distant half a mile; there is generally a land breeze in the morning.

Directions.—To proceed to this anchorage, steer for the north-east point of Das Rolas on a W. by N. course, until the peak on the

mainland (which is some distance in the interior) bears W. by S. $\frac{1}{2}$ S., then steer for it. It is not visible to a vessel approaching from the northward, until it is in line with the north extreme of Das Rolas island. When the small island off the south-east part of Matemo is shut in with Matemo, soundings will be obtained in 11 to 13 fathoms, and the reefs on each side are easily seen; from thence the water will gradually shoal to $4\frac{1}{2}$ fathoms, when in a line between the north-east points of Das Rolas and Matemo; after passing which the water gradually deepens again to 8 and 9 fathoms.*

In going in, do not haul up to anchor under the lee of Das Rolas, until Sangane point comes well open to the westward of it, in order to avoid a reef which extends about half a mile southward of Das Rolas.*

Wood is easily obtained on Das Rolas, but no water, nor are there any inhabitants. Stock can readily be procured from the river Kirinuzi on the main.

COAST.—**Sangane point** is a low white sandy point, with a reef extending nearly 2 miles off. In about the latitude of Sangane point, and between 4 and 7 miles from land, is Sangane reef, 3 miles in length by one mile in breadth.

For Lazarus bank, 50 to 80 miles eastward of Sangane point and reef, see p. 463, 464.

Pangane point.—A reef, in the middle of which is the small island of Inhate, extends $1\frac{1}{2}$ miles from Pangane point, nearly joining the south-west end of Mahato reef. The passage between Mahato reef and the reef from the main, is only adapted for dhows, having but one fathom at low water. The Portuguese have a settlement at Pangane point, with a population of about 300 persons. Kifula and Molandula islands lie between Sangane and Pangane points.

Mahato island, lying off Pangane point, has an extensive reef all round it, except on the west side, where there is a smooth anchorage for dhows.

Pantaloon shoal, about 4 miles northward of Mahato island, and in lat. $11^{\circ} 54' S.$, long. $40^{\circ} 36' E.$, is one mile in extent east and west, with a least depth of $2\frac{1}{2}$ fathoms, coral.

A sand-bank just awash at high tides, but generally visible, lies about $1\frac{1}{2}$ miles west-south-westward of Pantaloon shoal. This bank is steep-to on its west side, but a circular coral reef, which has 6 or 8

* See Admiralty chart :—Mozambique to Ras Pekawi, No. 1809.

feet water, extends from the bank about three-quarters of a mile in all other directions.

Another shoal patch, with one fathom water, lies W. by N. $\frac{1}{2}$ N., about $3\frac{1}{2}$ miles from Pantaloon shoal, with Ras Pekawi bearing N. by W., distant about $2\frac{1}{2}$ miles.

Northward of Pantaloon shoal there is good and clear anchorage.

RAS PEKAWI, in lat. $11^{\circ} 51' S.$, long. $40^{\circ} 31' E.$, is a low sandy point, with a clump of firs on its extremity, 70 feet high; half a mile off, and connected with the point by a reef, is a bushy islet, 17 feet high.*

From Ras Pekawi to Ras Nenumba, the coast for the first 4 miles consists of a sandy beach, with numerous villages, but the remainder is mangroves, intersected by creeks.

A wooded range of hills, from 250 to 280 feet high, extends parallel to the coast, from 2 to 3 miles inland. There is a yellow patch on the side of this range, 150 feet above the sea, $1\frac{1}{2}$ miles south of Ras Nenumba.

The shore reef extends 2 miles eastward of Ras Pekawi, and $1\frac{1}{4}$ miles east of Ras Nenumba; between these points it takes the direction of the coast, but with a varying distance of 3 cables to $1\frac{1}{2}$ miles.

Supplies.—A few fowls may be bought in the villages north of Ras Pekawi by giving two days' notice, but the natives will not come off to a vessel at anchor off Kisanga or Mdjumbi.

Kisanga island, 20 feet high, is sandy, covered with brushwood, and situated $3\frac{1}{2}$ miles eastward of Ras Pekawi, and on the western edge of a reef, which is 2 miles in extent.

Mdjumbi (Mattos) island is low, thickly wooded, about half a mile in length, and 200 yards in breadth; near its south-western end are two trees about 77 feet high; these are the first objects seen when approaching the island, and resemble a two-masted vessel. It is surrounded by a reef extending 3 miles north-east, $1\frac{1}{2}$ miles east, and one mile in a southerly direction, with patches of sand in places dry from 4 to 6 feet at low water.

Between the reefs of Kisanga and Mdjumbi there is a boat channel with from one to 3 fathoms water.

Anchorage.—The anchorage west of Kisanga may be approached with safety either from the north or south, care being taken if entering

* See Admiralty chart:—Ras Pekawi to cape Delgado, with views, No. 658; scale, $m = 0.35$ inch. The information relating to the coast and anchorages between Ras Pekawi and cape Delgado, is by Nav. Lieut. J. W. Dixon, H.M. surveying vessel *Nassau*, 1875.

by Mdjumbi pass to avoid Gray rock. A good anchorage may be obtained in 8 fathoms, sand and shell, half a mile from the reef, with Mdjumbi tall trees in line with Kisangi island bearing East, and Ras Pekawi S.W. by W. $\frac{1}{4}$ W.

The coast from Ras Nenumba to Ras Yamkumbi is low and swampy, fringed with mangrove, with numerous creeks; the sudden break in the hills at the back forms the most conspicuous feature of the coast.

Mto Marari is the only creek in this locality that has no bar across the entrance; boats drawing 2 feet can enter at low water, and there is deeper water inside. A large village probably exists on its banks, as a great number of dhows were seen to enter and leave the creek.

Mud and sand flats extend from half a mile to $1\frac{1}{2}$ miles off-shore, with boulders scattered over them.

The coast from Ras Yamkumbi to Ras Ulu, about $12\frac{1}{2}$ miles to the northward, is covered with mangrove trees, and seldom seen from outside the islands. The coast reef borders the shore from three-quarters to 2 miles distant.

The mouths of the creeks on this portion of the coast are dry at low water.

MDJUMBI PASS.—The opening between Mdjumbi reef and Mwamba Wadiazi, is 4 miles wide and perfectly clear, the heavy surf on the edges of the reefs marking the channel; the mainland will show very indistinctly, but Mdjumbi island will be clearly visible.

Gray rock, having $1\frac{1}{2}$ feet at low-water springs, is steep-to, and lies in the fairway to the anchorage off Kisanga island, with Kisanga summit bearing S.W. by S., and Mdjumbi high trees S. by E., $2\frac{1}{2}$ miles.

Mwamba Mcholi, a coral reef, dry at low water, is circular in form and 4 cables broad. From its centre Kero Nyuni bears N.E. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles.

Mwamba Wadiazi is a square-shaped reef, extending $5\frac{1}{2}$ miles to the eastward, and 4 miles to the southward of Kero Nyuni. It is composed of coral with numerous sand cays on it, the rocks uncovering in parts at low water, and the cays at half ebb; its northern, eastern, and southern faces are steep-to, but its western side is broken into a series of gullies with detached masses of coral, with one and 2 fathoms water between them.

Anchorage.—The sheet of water enclosed between Mdjumbi and Kero Nyuni islands, and the mainland, with the exception of the dangers mentioned above, has anchorage all over it, in from 5 to 15 fathoms.

The water shoals in the northern part over a bar with from 1½ to 3 fathoms water on it, connecting Seli-Seli rocks with Mwamba Wadiazi. The bottom off the entrances of the various creeks is mud over coral, but in the outer anchorages it is sand and coral.

Crawford reefs are several patches of coral which dry at half-ebb, lying 3 miles off the shore between Ras Yamkumbi and Ras Ulu, with only one to 2 fathoms between them and the coast reef.

KERO NYUNI PASS is 3½ miles wide between the reefs Wadiazi and Wanuni; it is deep and clear, with the exception of Mwamba Kizingiti, near the western end of the pass; a channel exists both northward and southward of this danger.

Kero Nyuni or Zanga, a small island, 20 feet high, covered with castor-oil bushes, lies on the north-western extreme of Mwamba Wadiazi, south side of Kero Nyuni pass.

Seli-Seli rocks.—At 2 miles eastward of Ras Yamkumbi, and connected with it by a reef, are three flat-topped coral rocks, 10 feet high.

Mwamba Kizingiti, a patch of coral drying only at low-water springs, near the centre of the pass, may be generally known by the sea breaking on it. From it, Kero Nyuni and Seli-Seli rocks are plainly visible, and distant from 3 to 3½ miles.

Mwamba Wanuni is 3 miles long in an east and west direction, and one mile broad; a small detached shoal lies off its western edge, with a boat channel between. Mwamba Wanuni dries in parts at half ebb, showing a high sand-bank. If approached with caution from seaward the lead will give timely notice, 7 to 8 fathoms being found at 3 cables distant.

A good anchorage during the southerly monsoon is in 6 fathoms, sand and coral, one mile north of Kero Nyuni, and for a small vessel during the northerly monsoon, 5 cables S.W. by W. of the same island.

Tides and current.—It is high water at Kero Nyuni, full and change, at 4h. 15m.; springs rise 13 feet. The tides inside the islands are weak and irregular, being greatly influenced by the winds; but the usual southerly current is experienced at a distance of 10 miles outside the reefs. See page 275.

NAMEGUO PASS to the northward of Mwamba Wanuni is $1\frac{1}{2}$ miles wide between the reefs, and clear of danger. It is the best pass for a stranger to enter by; the reefs show plainly, and the bottom is even, with fair anchoring ground over the whole of it. If the weather be moderately clear, Myonji summit will be seen to the north-north-westward.

Fungu Nameguo is an extensive coral reef, 4 miles long and 2 miles broad, on the north side of the pass, with several sand cays; the northernmost one is covered at high-water springs, when the sea breaks heavily on it. Its north-west edge lies $9\frac{1}{2}$ miles off Ras Ulu.

Its seaward edges are steep-to, and when there is any wind a cross sea is generally experienced off it. There is good anchorage off the western side of this reef.

Appearance of land.—From the eastern edge of Fungu Nameguo, if the weather be moderately clear, Myonji summit and the higher parts of Tambuzi island will be seen.

Mwamba Majiwe Kubwa lies $1\frac{1}{2}$ miles north-westward of Mwamba Wanuni, with a 5-fathom channel between them. On the north-west portion of the reef is a sand cay, which is only covered at high water springs.

Fungu Lamkunama, a coral reef, with a sand cay on its western end, uncovers at low-water springs; a 2-fathom patch lies half a mile westward of the cay.

There is a narrow but clear channel, with 6 to 9 fathoms water, between Fungu Lamkunama and Mwamba Majiwe Kubwa.

Chapman reef, $1\frac{1}{2}$ miles northward of Fungu Lamkunama, is a coral reef, three-quarters of a mile long east and west; it dries at low-water springs, and has deep water all around.

Ras Ulu or Vela, the southern extreme of Mazimbwa bay, is a mangrove point, 80 feet high. It makes as a series of flat ridges.

A reef extends upwards of 5 miles south-eastward of this point, with several detached patches on its southern side; rocks and shoal water extend one mile from its north-eastern edge into Myonji pass.

Myonji island.—At $2\frac{1}{2}$ miles eastward of Ras Ulu, Myonji island rises 66 feet above the reef, the summit being near its north-west extreme. The island is one mile long, 2 cables broad, and thickly wooded.

At one mile farther out on the reef are several mangrove trees, which, when seen clear of the land, closely resemble dark flat rocks.

Water.—Myonji island is much used by fishermen, who obtain their drinking water from wells some distance within Ras Ulu.

Anchorage.—Within the outer reefs there is excellent shelter in from 5 to 12 fathoms, the bottom being sand over coral.

The best position depends on the monsoon ; the prevailing strong winds being from N.E. and S.E.

As there is no trade on this part of the coast, nothing is gained by approaching the shore by the passages between the inner reefs ; if obliged to do so, the most favourable time is at low water with the sun astern of the vessel ; the lead should be kept constantly going.

Tides.—The tides inside the outer reefs are irregular ; the flood is stronger than the ebb, and enters by the various openings between the reefs.

TAMBUZI PASS, between the reefs of Tambuzi island and Fungu Nameguo, is 3 miles wide, with Bower shoal in the fairway.

Bower shoal consists of patches of coral, the shoalest water, 9 feet, being near its eastern edge. Taking the depth of 5 fathoms as a limit, the shoal is one mile long and half a mile broad.

To avoid this shoal, do not bring the south extreme of Myonji between the bearings of W. $\frac{1}{2}$ N. and W. by N. $\frac{3}{4}$ N.

Tambuzi island is $1\frac{1}{2}$ miles in length, east and west, and a quarter of a mile in breadth ; it may be easily distinguished by being higher than the surrounding islands, and by groups of tall fir trees near its extremes. The reef on which this island stands extends for 2 miles on all sides, with the exception of the western.

Anchorage.—There is good anchorage three-quarters of a mile west of Tambuzi, in 9 fathoms, sand and coral, Myonji summit bearing S.W. by W. $\frac{1}{2}$ W.

No Water.—Fresh water cannot be obtained from any of the islands between Ras Pekawi and cape Delgado ; and it is for this reason that the islands remain uninhabited.

Masasari rock is 3 feet high, with a sand cay which uncovers at a quarter ebb, at one cable to the north-westward.

Mshanga island, 54 feet high, is of coral, wooded, and with a reef extending one mile eastward and southward.

Myonji pass, between Mshanga and Myonji reefs is $1\frac{1}{4}$ miles wide, but narrowed to one mile by the rocks and shoal water

extending northward from the reefs surrounding Myonji and Ras Ulu ; it is the only ship channel to Mazimbwa bay, and carries from 13 to 30 fathoms water.

MAZIMBWA BAY, situated to the northward of Ras Ulu, is a capacious and well-sheltered anchorage, with depths of 5 to 9 fathoms. The southern shore of the bay is covered with mangroves, backed by a wooded range 200 feet high. Ras Niguro, the north point of entrance to Mazimbwa river, is a bold cliffy point, the highest on this part of the coast ; the cliffs continue along the northern shore of the bay for 2 miles, thence the coast to Ras Msangi is low and sandy, occasionally fringed with mangroves.

Mud flats extend one mile off the south shore of Mazimbwa bay.

Mwamba Msaro.—At one mile off these mud flats is Mwamba Msaro, a narrow coral reef 2 miles long, extending parallel to the shore, with shoal water between it and the shore reef. It dries at low-water springs.

Mwamba Kisocha may be considered the northern limit of Mazimbwa bay ; this reef projects $2\frac{3}{4}$ miles from the mainland, with several detached pieces of coral to the southward, and shoal water reaching $3\frac{1}{4}$ miles from the shore.

Ras Niguro bearing W. by N. $\frac{1}{2}$ N. leads clear of the southern limit of the shoal water ; and Ras Msangi tall trees bearing N.N.E, leads eastward of it.

Directions.—To proceed to Mazimbwa bay, having entered by Tambuzi pass, and observed the clearing mark for Bower shoal (page 264), vessels should then pass southward of Masasari rock (3 feet high) at a half to three-quarters of a mile distant, and bring it to bear E. by S. $\frac{1}{2}$ S. ; this bearing on astern and steering W. by N. $\frac{1}{2}$ N., will lead through Myonji pass ; when Myonji summit bears S. by E. $\frac{1}{2}$ E. or the western extreme of Mshanga N.E. $\frac{1}{4}$ E., steer N.W. $\frac{1}{2}$ N., avoiding the spit extending from Mwamba Msaro, until Ras Niguro, the north point, of Mazimbwa river bears W.N.W., when it can be steered for on that bearing, anchoring as convenient in Mazimbwa bay. There is an intricate channel from the northward along the shore, for which see Ras Msangi, p. 267, 268.

Anchorage.—When inside Myonji pass, a vessel can always anchor, the depths varying from 5 to 10 fathoms, muddy bottom. A good berth is in 8 fathoms, with Ras Niguro bearing W. by N. $\frac{1}{4}$ N., and Ras Ulu S.S.E. ; a small vessel may proceed nearer the river and anchor in about 4 fathoms.

Tides.—The flood sets to the westward, and is scarcely felt, but the ebb sets to the eastward at the rate of from 2 to 3 knots an hour at springs.

Mazimbwa river or creek.—In the western part of Mazimbwa bay is a creek with numerous bends, that trends north-west for 4 miles, and is then lost in a mangrove swamp. Boats can only ascend it on a rising tide; extensive mud and sand banks narrow the channels to a few yards in width.

Lupululu island, in the entrance to the river, is low, sandy, and covered with large baobab trees; patches of large black rocks extend from its eastern end, leaving a narrow boat channel close to Ras Niguro.

Port Mazimbwa, within the river, has a general depth of $1\frac{1}{2}$ fathoms. Holes of 6 and 3 fathoms exist, but are surrounded by shallow water. The narrow and circuitous passage with $1\frac{1}{2}$ fathoms water, south-west of Lupululu island, leads from the bay to the port.

The town of Mazimbwa, on the north side of the port, has a population of about 400, under Portuguese jurisdiction. The fort is a ruin overgrown with weeds and not distinguishable from seaweed.

On the western side is Mtamba village, consisting of about 100 huts.

Supplies.—Fowls, goats, sweet potatoes, cassava, and sweet lemons, can be obtained by giving two days notice. Water may be obtained from a well in Mtamba village; it has a pleasant taste, but is of a milky-white colour.

Several Banians reside at Mazimbwa, exporting india-rubber in a raw state, and importing American cloth, arms, &c. A dhow runs monthly to Ibo.

SUNA PASS, between Tambuzi island reef and Mwamba Tambula, is $2\frac{1}{4}$ miles wide and clear of danger. Vessels from the northward may enter Mazimbwa bay by this pass, on either side of Massasari rock, and thence as before directed (p. 265); the shoalest water is $5\frac{1}{2}$ fathoms nearly in mid-channel.

Suna island is small and of coral formation, with its summit crowned with trees 58 feet above the sea; it is free from danger on its western side, but a reef extends about one mile in an east and south direction.

Luwinka rock, 6 feet above high water, and about $2\frac{1}{2}$ miles south-west of Suna island, bears a strong resemblance to the black hull of an unmasted vessel.

Congo island is small and circular, 35 feet high, having, in 1875, a tall dead baobab tree in its centre. The surrounding reef extends $1\frac{1}{2}$ miles south-east of the island, and on it are several boulders, uncovering at quarter ebb. Shoal patches of coral also extend $2\frac{1}{2}$ miles in northerly and westerly direction from the island.

Mwamba Kisanga Mungu embraces the whole of the numerous coral patches and rocks lying between Mshanga and Congo islands in one direction, and Suna island and the round coral islet in the other.

It consists of extensive coral reefs, with several sand cays and detached rocks, with one and 2 fathoms water between them. These coral patches and shallow water extend north and south over a space of about 10 miles.

A narrow channel, with $1\frac{1}{2}$ fathoms water, lies between Luwinza reef and the shoal north of it, fit only for dhows and boats.

NYUNI PASS, between Mwamba Tambula and the reefs extending southward from Kifuki and Mtundo islands, is $3\frac{1}{2}$ miles wide at the entrance, but narrowed to $\frac{1}{4}$ of a mile by Gray patches and a 3-fathoms shoal off the south side of Kifuki island.

Mwamba Tambula, forming the south side of Nyuni pass, is 4 miles in length by 2 miles in breadth, with sand cays and boulders drying from 5 to 9 feet. It is steep-to on the northern and eastern faces, and the heavy surf plainly marks the edge of the reef.

Nyuni island, 17 feet high, at the north-west extreme of the reef, is small, flat, and covered with short grass.

Gray patches extend $2\frac{1}{2}$ miles N. by W. $\frac{1}{2}$ W. from Nyuni island; they consist of one 16 feet patch and several 18 feet patches, with 4 and 5 fathoms water between them.

Directions.—To enter Nyuni pass, steer for Nyuni island on a S.W. by W. $\frac{1}{4}$ W. bearing, until a square black clump of trees on Ras Msangi (probably the only portion of the main land visible) bears N. W. by W. $\frac{1}{4}$ W., when the trees can be steered for; this course will lead a vessel in mid channel with not less than 10 fathoms.

RAS MSANGI, the northern extreme of Mazimbwa bay, is a well marked point 47 feet high; it may be recognized by a square black clump of tall fir trees, 94 feet high, on its northern side, the most conspicuous object on this part of the mainland.

The coast reef extends $1\frac{1}{2}$ miles eastward of Ras Msangi, and shallow water borders the point to a distance of $2\frac{1}{4}$ miles, and thence the coast to the south-westward to Mwamba Kisocha.

Channel.—A 3-fathom channel to Mazimbwa bay exists southward between the shallow ground extending from the shore of Ras Msangi, and the shallow ground to the north and west of Congo island, but it is so circuitous and narrow, with no leading marks, that it is impracticable for vessels.

Jeffreys rock, a pinnacle having less than 6 feet water, with 4 to 6 fathoms around, is the southern danger in this channel; it lies with Msangi high clump bearing N.E. $\frac{3}{4}$ N. and Congo island S.E. $\frac{1}{2}$ E.

KIFUKI and MTUNDO ISLANDS are on one reef, and being almost joined together, may be considered as one island. Both are about 80 feet high and thickly wooded; when made from the south-eastward the various elevations appear as detached hills, the highest on Kifuki being a cone-shaped clump of trees. On the reef, at the north-east end of Mtundo, is Sandcay islet, 23 feet high, and Makunga islet, 8 feet high; the latter is not easily recognised.

A reef skirts the south coast of Kifuki and Mtundo at the distance of half a mile; at the south-east extreme of Mtundo the reef becomes more extensive, and curves round to the southward and westward at the distance of $1\frac{1}{2}$ and $1\frac{3}{4}$ miles from the shore, leaving a lane of water from one to 2 fathoms deep between the outer and inner portion of the reef.

The reef on the eastern side of Mtundo extends about half a mile from the shore; it is steep-to, and trends to the northward $1\frac{1}{2}$ miles beyond Mtundo.

The shoal, with 3 fathoms water, previously referred to, off the south point of Kifuki, forms the north limit of Nyuni pass.

Kifuki pass, between Ras Msangi and Kifuki island, has a coral shoal of $4\frac{1}{2}$ fathoms, and 3 cables in extent, in mid-channel, with its centre bearing W. $\frac{3}{4}$ N. distant $1\frac{1}{2}$ miles from the western point of Kifuki. The western point of Kifuki may be rounded at a distance of 4 cables, but shallow ground, with a depth of $1\frac{3}{4}$ fathoms, extends 2 miles eastward of Ras Msangi.

Anchorage.—Good anchorage will be found in 5 and 6 fathoms, sand and coral, three-quarters of a mile north or south of the west point of Kifuki, according to the monsoon.

Tides.—It is high water in Kifuki pass, full and change, at 4h. 10m.; springs rise 14 feet, and neaps 9 feet, the flood setting north-westward from 2 to 3 knots at springs, but scarcely perceptible at neaps.

MTUNDO PASS is the opening between the reefs of Mtundo and Wamizi islands; there is a deep and clear channel $3\frac{1}{2}$ miles wide between Fungu Makunga and Wamizi reef. The best channel to the inner anchorage is the one northward of Penguin shoal.

That to the southward of Penguin shoal has depths of 4 to 6 fathoms between the various reefs, but the water shoals to $3\frac{3}{4}$ fathoms between Vumba and Kisingura islands with several patches of from 2 to 3 fathoms.

Appearance of Land.—Wamizi island is the highest of the islands in this district, and may be known by the large number of wooded eminences making as detached hillocks from seaward; on a nearer approach the reef will be seen breaking heavily with a white sandy beach at the back. The wooded islet Mkunga, 30 feet high, and a sand cay, are on the reef off the northern extreme of Wamizi. The mainland is not visible outside these islands.

Fungu Makunga are detached shoals of $2\frac{3}{4}$ and 3 fathoms on a bank, the 5-fathom limit of which is $3\frac{7}{10}$ miles north-east from the north-east point of Mtundo. There is generally a swell in Mtundo pass, causing the sea to break heavily on these patches at low water.

Mwamba Mtundo are coral and sand patches, drying at three-quarters ebb, situated 2 miles northward of Mtundo; detached patches of coral with deep water between, connect it with Mtundo island.

Gulnare reef lies one mile west-north-west of Mwamba Mtundo, with 4 to 6 fathoms water around it. Small craft should not use the channel on either side of Gulnare reef, except at low water, when the reefs show plainly; the eye and lead are the best guides.

Penguin shoal, one mile northward of Gulnare reef, is $1\frac{1}{2}$ miles in extent, with a least depth of 6 feet.

Vumba and Kisingura islands are both wooded, and 64 and 44 feet high respectively.

At $1\frac{1}{2}$ miles north-eastward of Vumba island is a mushroom-shaped coral islet 4 feet above high water, standing in the centre of a coral flat $1\frac{1}{2}$ miles in extent.

Directions for Mtundo pass.—The channel northward of Penguin shoal, narrowed by a spit with $2\frac{3}{4}$ fathoms on it, extending $1\frac{4}{5}$ miles from the south extreme of Wamizi, is 8 cables wide, with depths of 8 to 10 fathoms.

To proceed to an anchorage within the islets; after passing Fungu Makungu, bring Ras Nondo to bear N.W. $\frac{1}{4}$ W., and steer for it until

the west extreme of Vumba bears S.W. $\frac{1}{2}$ S., when a course can be steered to the southward, anchoring when convenient.

A good position is in 7 fathoms, sand, with Ras Nondo bearing N.W. by N., and the west extreme of Vumba S.W. The passage inside Vumba, between it and the shore flats, is only 3 cables wide, with a depth of 4 fathoms, and only practicable for handy vessels of light draught.

If entering Mtundo pass from the southward, do not bring the eastern extreme of Wamizi to bear eastward of North, until Vumba island bears W. by S.; the latter will show as two small distinct black lumps.

COAST.—Ras Nondo, on the mainland, lies abreast of Wamizi island; the shore immediately north of Ras Msangi forms a bay about two miles deep; sand flats, dry at low water, extend all along shore to the northward at a distance of 2 miles, rendering landing impracticable except at high water; these sand flats are again bordered by shallow water which extends $3\frac{1}{2}$ miles from the shore. The land is low and wooded, and there are villages consisting of a few huts on the coast, from the inhabitants of which a few fowls may be obtained; these villages will be found in the cocoa-nut groves.

Ras Nondo may be easily recognised from the southward by a group of tall fir trees. The coast sand bank extends nearly 2 miles north-east of this point, leaving a boat passage between it and the west end of Wamizi island.

WAMIZI PASS.—The opening between the reefs of Rongwi and Wamizi islands is $5\frac{1}{2}$ miles across, and between the reefs of Keramimbi and Wamizi $3\frac{1}{4}$ miles. The passage is deep and clear, with the exception of Mwamba Mpanga-panga.

Wamizi island is nearly 8 miles long, east and west, and rather less than one mile broad; it is 63 feet high at its west end, and 92 feet high at its east end, and wooded; several of the high clumps of trees bear a certain resemblance to hills when at a distance. The island is fringed by a reef to a distance of $1\frac{1}{2}$ miles in places.

The Portuguese formerly had an establishment here, but the scarcity of water caused its removal.

Mwamba Mpanga-panga.—The south end of this danger lies about $2\frac{1}{4}$ miles north-east of the west extreme of Wamizi; the reef is $1\frac{1}{2}$ miles in extent, composed of coral and sand, with 2 feet least water, and steep-to on all sides; it is usually difficult to recognise except at low water.

Keramimbi island, 40 feet high, on the northern side of Wamizi pass is nearly one mile long, by half a mile broad, and thickly wooded. Shoal water and coral patches, some dry at low water, surround this island at a distance of $1\frac{1}{2}$ miles to the southward and eastward ; the whole space within the island as far northward as Ras Afunji, is shallow ground.

Pollard shoal, half a mile in extent, with $1\frac{1}{2}$ fathoms water, and steep-to, lies S. by E. $\frac{1}{2}$ E., distant $2\frac{1}{4}$ miles from the east extreme of Rongwi island.

Directions.—When entering Wamizi pass, borrow a little on Wamizi island, but taking care not to close it within 2 miles, until Mkunga islet off the north end of Wamizi bears S.E. by E. ; it will then show clear of the island, and if kept on this bearing astern, will lead to an anchorage in 10 fathoms, sand and coral, with the east point of Keramimbi bearing N.N.E.

MAIYAPA BAY.—The shores of this bay, between Ras Nondo and Ras Afunji, 12 miles apart, are bordered with extensive sand banks and shallow ground, which with Mwamba Mpanga-panga, Keramimbi and its surrounding reefs, together with numerous deep holes of 30 and 20 fathoms, limit any anchoring ground to a comparative small area.*

The western part of the bay near port Mluri is mangrove, but the north and south portions are sand. The only prominent features in Maiyapa bay are three tall fir trees, the centre and largest is $2\frac{1}{2}$ miles north-west of Ras Nondo. In the south-west part of the bay at 4 and 5 miles respectively, north-west of Ras Nondo are the rivers Mluri and Maiyapa. The principal village in the bay is that of Marongo, consisting of 70 huts ; a few fowls, goats, and sweet potatoes may be obtained. A range of wooded hills, 200 feet high, extends from about Ras Niguro northward to cape Delgado. Several villages are situated in the cocoa-nut groves.

Directions.—Vessels proceeding to Maiyapa bay, may use the channel either northward or southward of Mwamba Mpanga-panga, but the northern is recommended on account of the more gradual shoaling of the water.

To enter by the north channel, follow the directions laid down for Wamizi pass above, but instead of anchoring as there directed, steer W.S.W. for the south-eastern of three remarkable firs, until the single tree on west end of Wamizi bears S. $\frac{1}{2}$ E., then alter course to

* See Admiralty chart, Ras Pekawi to cape Delgado, No. 658.

N. by W. $\frac{1}{4}$ W., and anchor as convenient in from 6 to 10 fathoms, sand and coral.

The south channel, between Mwamba Mpanga-panga and that of Wamizi is three-quarters of a mile wide, the shoals on both sides being steep-to. To proceed through this channel, borrow a little on Wamizi island until the single tree on its western end bears W.S.W. ; steer for it on that bearing until a conspicuous rise (the second clump of trees 80 feet high, $1\frac{1}{4}$ miles from the eastern extreme of Wamizi) bears S.E. by E. $\frac{1}{4}$ E. ; keep this bearing on astern until Wamizi single tree bears S. by W. $\frac{1}{2}$ W., thence a N. by W. $\frac{1}{4}$ W. course will lead to an anchorage in the northern portion of Maiyapa bay.

Anchorage.—The anchorage ground in Maiyapa bay off the passage leading to port Mluri is composed of mud, but in other parts sand and coral. Good anchorage, but rather exposed to the ocean swell, may be found in 7 fathoms, with the extremes of Wamizi bearing S. $\frac{1}{2}$ E. and S.E. by E., and Keramimbi south point E. $\frac{1}{2}$ N.

H.M.S. *Nassau* rode out a strong south-easterly gale in smooth water, 5 cables south-west of Mwamba Mpanga-panga in 6 fathoms, sand and coral.

Tides.—In Maiyapa bay, the flood sets south-westward, and the ebb south-eastward at the rate of 2 to 4 knots at springs.

Port Mluri.—A tongue of sand, dry at half ebb, projects 2 miles northward from the southern shore of Maiyapa bay, and shallow water extends for a further distance of 2 miles, westward of which is the channel to port Mluri. This channel is narrow, with a 9-feet shoal in the fairway ; the anchoring ground in the port has depths of 7 to 10 fathoms, mud ; but is adapted for small vessels only. The Portuguese have a settlement here.

COAST.—**Ras Afunji**, 15 feet high, the southern point of Tunghi bay, is bold and sandy, with sand banks projecting one mile from it. The channel between the point and Rongwi island, is one mile wide at low water, but so obstructed by coral reefs as to be only navigable by boats.

Dhows trading to Kiuya, however, frequently pass through at high-water springs.

Rongwi and Tekomaji Islands may be considered as standing on one continuous coral reef, upwards of 9 miles long in a north and south direction, the seaward face of which is steep-to, as is also Pollard shoal already described. The reef skirts the islands generally at a distance of one mile, and on the south-east part, where it extends

farther off, there are several detached black rocks uncovering at half ebb.

Rongwi island is 2 miles from Ras Afunji, and 1½ miles from Tekomaji ; off its north-west point is the well-wooded islet of Kamesi, 40 feet high. Tekomaji island is of a triangular shape, 2 miles long, and as its name implies, there is no water on this island.

When approaching these islands from seaward, the only distinguishing features are two rounded lumps of trees 94 feet high on the eastern part of Rongwi, and when within 6 miles, three fir trees on the eastern shore of Tekomaji will be seen ; there is also a remarkable single fir tree on the north-western point of Tekomaji. Both islands are low and flat, but densely wooded ; the outer coast of Tekomaji is rocky, but that of Rongwi is principally sandy beach.

TUNGHI BAY, formed by cape Delgado on the north and Ras Afunji on the south, is semi-circular, having a sandy beach around its shores with the exception of the portion between Kiuya or Tunghi village and cape Delgado, which is rocky. The land between cape Delgado and Mto Mnangani is from 80 to 200 feet high, thence to Ras Afunji it is low and flat. On the wooded ridge, west of Mto Mnangani is a single baobab tree, also a compact group, 250 and 228 feet high respectively, the former is the highest ground in the vicinity of cape Delgado. There is also a conspicuous single palm tree 75 feet high, half a mile from cape Delgado, which shows distinctly all over Tunghi bay.*

From Ras Afunji round the head of the bay to Kiuya village are sand and coral flats stretching one mile from off shore ; shallow water extends a considerable distance beyond.

The entrance to Tunghi bay between the reefs of cape Delgado and Tekomaji is 2½ miles wide, and the only channel into Tunghi bay. The reef extends 1½ miles off the northern and north-eastern ends of Tekomaji, and is steep-to with no off-lying patches ; the reef off cape Delgado projects one mile south-eastward and is similar in character to Tekomaji reef ; a heavy surf marks the edges of these dangers.

Mto Mnangani, in the western part of Tunghi bay, is 3 cables wide at the entrance, but banks which dry at low water, narrow it to less than one cable ; canoes can only ascend 1½ miles from the mouth. The village of the same name, consisting of a few well-built huts, is on the western bank of the river. Fowls and excellent fish can be obtained.

* See Admiralty chart, Ras Pekawi to cape Delgado, No. 658.

Kiuya village, also called Tunghi, is concealed from view by a belt of thick mangrove bushes which front the shore, but the position of the village may be readily identified by an unusually thick and tall grove of cocoa-nut trees. The old fort is a small square building in a dilapidated state with three guns, probably 6-pounders, only one of which is mounted and occasionally fired. The natives were civil, although many of them were armed with knives and spears ; but they have a bad name with former cruisers.

Dhows trading to this place anchor off the village until high water, when they proceed into narrow lanes cut in the mangroves ; with their mast down they are completely hidden from view of a boat passing immediately outside.

Supplies.—A few fowls were obtained here in exchange for calico, money was also taken, but the best articles for barter are powder, calico, tobacco, and beads.

Firewood may be cut on any part of the coast between Ras Pekawi and cape Delgado ; it is generally ill adapted for steaming purposes, but by a careful selection of trees, many of them might advantageously be used with coal.

Climate.—Disease.—Small-pox of a virulent character existed in October, 1875, amongst the villagers northward of Ras Pekawi, communication between many of the villages had been broken off to stop the contagion ; the disease had been imported from Madagascar. The fever months were coincident with the principal rainy ones, viz., February to May.

Directions.—When entering Tunghi bay, if in the morning, the single palm near cape Delgado, and the baobab trees mentioned above, will probably be seen ; approaching from the northward, the single fir on the north-western point of Tekomaji will show as an extreme ; during the afternoon the main land is covered with haze, and a stranger would experience difficulty in recognising these points.

The group of baobab trees bearing W. $\frac{1}{2}$ N. leads in mid-channel ; soundings will not be obtained with the hand lead until Ras Afunji is well open westward of Tekomaji. The channel leading to the anchorage in the western part of Tunghi bay is only 5 cables wide between the 5-fathom lines of soundings, with a least depth of 8 fathoms. To proceed through, keep the group of baobab trees as mentioned before, W. $\frac{1}{2}$ N. until Ras Afunji bears S. $\frac{1}{4}$ W., then steer S.W. by W. $\frac{1}{4}$ W., until Tekomaji tree bears E.S.E., or group of

baobab trees W. by N. $\frac{1}{2}$ N., when if the latter is steered for it will lead to an anchorage, which must be chosen with caution.

Anchorage.—The best anchorage is in 9 fathoms, mud, with Ras Afunji bearing S.S.E. $\frac{1}{2}$ E., the extreme of cape Delgado E.N.E., and the group of baobab trees W. by N.; the bay is exposed to the ocean swell.

For a passing vessel the best anchorage in either monsoon, sheltered from the swell, is westward of the north-west point of Tekomaji.

Tides.—It is high water, full and change, in Tunghi bay, at 4h. 5m.; springs rise 14 feet and neaps 9 feet.

Winds.—From information received from the natives and old residents on this coast, the time of the change of the monsoon as well as its strength is rarely the same for two consecutive years; but the general experience gained in H.M.S. *Nassau*, whilst surveying the coast was as follows; north-easterly winds from December to March, getting lighter as the season progresses, varied occasionally by heavy squalls of wind and rain from N.W., accompanied by vivid lightnings and heavy thunder.

The change of monsoons occurs in April, heavy squalls then frequently blow from South and S.W. By the beginning of May the steady southerly monsoon has set in, generally freshening in the afternoon to a strong breeze; from this month the force gradually lessens, and the wind veers to the eastward; by October very light easterly winds prevail, the change to N.E. taking place in the early part of November in a gradual manner with a few light showers.

Between the islands and the main, land and sea breezes prevail, the latter during the months of May and June blow very fresh.

CURRENT.—As previously stated at page 24, the separation of the equatorial current takes place between the parallels of about lat. 10° to $11^{\circ} 0'$ S., or in the vicinity of cape Delgado. During the height of the north-east monsoon, the separation is at its maximum northern limit, and *vice versâ*.

As an instance.—H.M.S. *Diamond* in January 1877, from Mafia island to cape Delgado, experienced the usual northerly current about 2 miles an hour until within 40 miles of the cape, when the current was found setting to the southward at the same rate.

CHAPTER VIII.

CAPE DELGADO TO RAS KIMBIJI, APPROACH TO ZANZIBAR CHANNEL.

(Lat. $10^{\circ} 40' S.$ to lat. $7^{\circ} S.$)

VARIATION IN 1889.

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---------------------|
| Cape Delgado | - | - | - | - | - | $11^{\circ} 30' W.$ |
| Port Kilwa | - | - | - | - | - | $11^{\circ} 10' W.$ |
| Mafia, Ras Mkumbi (Moresby point) | | | | | | $10^{\circ} 15' W.$ |

CAPE DELGADO, known by the natives as Ras Kongo, is low, covered with trees, and not easily distinguished from the other low land and islands when coming from the southward, but from the northward it makes like an island. A palm tree, 75 feet high, stands on the south side of the cape half a mile from its extremity. A coral flat, dry at half tide, fringes the cape, extending in places to the distance of one mile.* For currents, see preceding page.

LIGHT.—From a wooden lighthouse, painted black, erected on cape Delgado, is exhibited, at an elevation of 59 feet above high water, a *fixed* white light, visible seaward between the bearings of N. 25° E. and S. 25° E., from a distance of 10 miles in clear weather.

Cape Rovíma or Ras Swafo is about 14 miles N. by W. $\frac{1}{2}$ W. of cape Delgado. From cape Delgado the coast is low and thickly wooded as far as cape Rovíma or Swafo, a distance of 14 miles; between are the bays of Mbwezi and Keonga, which are separated by Ras Nasunga. The shore for the whole distance is skirted by extensive reefs and shallow water.

The long ocean swell generally breaks heavily on these reefs, which are visible some distance off.

* See Admiralty charts:—Cape Delgado to Kilwa, No. 1808, scale $m = 0\cdot2$ inch; and cape Delgado to Mikindani bay, with views, No. 690, scale, $m = 1\cdot0$ inch. The information relating to the coast between cape Delgado and Mto Porwe is by Lieutenant F. J. Gray, R.N., commanding H.M. surveying vessel *Nassau*, 1874.

Mbwezi bay, between cape Delgado and Ras Nasunga, is about $5\frac{1}{2}$ miles across, and forms a bight 2 miles deep, with a long white sandy beach in its north-western part. There is, however, no anchorage in this bay, the reefs which skirt the coast being steep-to, and as there are no creeks, landing is seldom practicable.

Mbwezi village stands at the head of the bay, near the south end of the sandy beach, in a groove of cocoa-nut trees; on the coast fronting it are the white ruins of a tomb.

Ras Nasunga, the northern point of Mbwezi bay, is low, and may be easily recognised by the number of detached rocks off it. A dangerous reef, with rocks and boulders on its outer edge extends in a south-east direction $1\frac{1}{2}$ miles from the point, diminishing to about three-quarters of a mile near the village of Mbwezi, and thence round cape Delgado. The sea, which generally breaks on the edge of the reef off Nasunga, was probably mistaken for a supposed detached reef named Manbaquitana, referred to in an old memoir; but constantly while at anchor near it in the *Nassau*, the sea was observed breaking heavily on the outer edge, while inside it the water was comparatively smooth.

KEONGA BAY, 4 miles across between Ras Nasunga and Ras Samadudu, is shallow for 2 miles from its head, where there are a number of sand-banks that dry at low water spring tides.

The water deepens rapidly outside the 5-fathoms line, which is one mile or more off shore, affording little or no anchorage, and the bottom is rocky. Within that depth numerous heads of coral and boulders uncover at low water spring tides.

Mto Keonga and Mto Mpambi, at the head of Keonga bay, are arms of the sea; the water from Mto Mpambi is reported to join Mto Decomba to the north-west at spring tides, when it is available for canoes.

Keonga, a village about 2 miles up the creek of that name on the south side, stands in a grove of cocoa-nut trees, on a small ridge 70 feet high, and is the resort of many of the dhows trading on the coast. It contained (in 1874) about 1,000 huts, and had an estimated population of 3,000; the entire place and people belonged to an Arab.

Water.—The people are very poor and no stock is to be procured, but good water may be obtained at a well in the creek fronting the village, in which creek the dhows usually lay screened from observation.

The channel leading to Keonga is shallow and tortuous, boats should only ascend it with a rising tide.

Mwamba Ricoma is the southern termination of the coast reef which extends off Ras Samadudu for a distance of $1\frac{1}{2}$ miles, forming the northern boundary of Keonga bay. Its outer edge, dry in places at low water, is composed of rock and coral, but inside it is white sand over coral.

Directions.—Anchorage.—The best anchorage is in $7\frac{1}{2}$ fathoms, sand, with the extreme north point seen bearing N.N.W., Mto Keonga south point W. by N. $\frac{1}{4}$ N., and Ras Nasunga S.S.W.

To pick up this anchorage, bring the extreme of Ras Nasunga to bear S.S.W., and steer for it, until in 10 fathoms water, when the anchor should be immediately let go.

ROVÚMA BAY is contained between Ras Swafo and Ras Matunda, the distance between being about 9 miles, and the depth of the bay to the river entrance about 4 miles.

Ras Swafo (Cape Rovúma), the south-east point of Rovúma bay, is low and thickly wooded, with a small conical hill, 77 feet high, at a quarter of a mile from the coast ; this hill is conspicuous when near the land. The coast of Swafo from Ras Samadudu is low and thickly wooded, and fronted by a reef to the distance of $1\frac{1}{2}$ miles.

From Ras Swafo to the south point of Mto Letokoto the land is low, covered with mangrove trees, and nearly all swamp at high water, spring tides. About 2 miles northward of the Rovúma, on the coast, is a conspicuous square clump of trees, and at $1\frac{1}{2}$ miles farther north is a group of three remarkable tall trees, which from seaward form one of the most prominent features in Rovúma bay.

Kilima Mundo is a rather sharp well-wooded peak, 350 feet high, on the south side of Rovúma river. Being the highest land in the vicinity it is seen over the trees near the coast from a few miles offshore, and as the elevated plateau northward of the river has no conspicuous peak, Kilima Mundo cannot well be mistaken from seaward.

Kilima Macheriuka, north of Rovúma river, is the south-east shoulder of a long flat range extending to the north-westward. From seaward this shoulder may be readily identified by three large baobab trees near the summit of its eastern face, one of which is 340 feet above the sea.

Mwamba Swafo is the continuation of the reef fronting the coast from the southward. To the northward of Ras Swafo it dries in patches at low water, springs, nearly three-quarters of a mile from the shore, and to the eastward for $1\frac{1}{2}$ miles, with depths of one to 2

fathoms, at the distance of $1\frac{1}{2}$ miles. The edge of this bank is steep-to, and the tides are strong, so that as the lead would give but little warning, a vessel should not on any account close the land within $2\frac{1}{2}$ miles.

Mto Decomba is a creek three-quarters of a mile westward of Ras Swafo, with a bar at the entrance on which the sea generally breaks heavily, but it is at times possible for a boat to get in at half flood. Within the bar depths of 2 to 3 fathoms water can be carried for one mile to the south-westward. This creek is reported to be navigable at high water for canoes to Keonga bay.

Mto Mquango is a small creek or inlet eastward of Rovúma river into which boats can enter at high water, springs, but some little distance up it is almost impassable for canoes. The sea generally breaks heavily off the entrance of this creek.

Mto Letokoto, a creek north of Rovúma river, is about three-quarters of a mile wide at the entrance, and reported to be navigable by canoes for a distance of 15 miles to Rovúma river, but it is rendered useless for navigable purposes by a reef and sand-bank which dry across the mouth, making it impossible to effect an entrance from seaward.

Ras Matunda, the north point of Rovúma bay, may be easily recognised by a series of white sand-hills, 80 feet high, about one mile in extent, near the coast, with a single tall tree on their eastern extreme, which is conspicuous from the northward or southward.

The coast reef dries nearly one mile off Ras Matunda, whence it trends south-westward to the remarkable trees southward of Mto Letokoto, where its distance decreases to $1\frac{1}{2}$ cables, but with shallow water some distance beyond.

Anchorages.—There is good anchorage on the south side of Rovúma bay in 7 fathoms, mud, with Ras Matunda bearing N. by W.; Kilima Mundo, S.W. by W.; and extreme of Ras Swafo, S.E.

This was found the most convenient anchorage, as less swell was experienced than in other parts of the bay. Good anchorage may also be obtained on the north side of the bay, in 10 fathoms, mud, with Ras Matunda bearing N. by E.; and the remarkable trees, W. $\frac{1}{4}$ N.

There is no anchorage immediately off the river entrance, as the bank is very steep, and the depth decreases from 90 fathoms to 5 fathoms within a distance of 2 cables.

Landing.—Westward of Mto Decomba is a long flat sandy beach, on which it is possible to land occasionally, but between Rovúma river and Ras Matunda it is seldom possible to effect a landing, the bay being quite open to the ocean swell, and heavy rollers are at all times breaking.

Tides.—It is high water in Rovúma bay, full and change, at 4h. 10m.; springs rise 12 feet; the ebb running to the northward and flood to the south-eastward. When the river is high the current runs out without ceasing, overcoming the flood tide.

ROVÚMA RIVER is at the head of Rovúma bay, and 5 miles westward of Ras Swafo. Its width at the mouth between the trees is about 8 cables, but at low water this is reduced by a sand bank that dries from the west shore to less than 4 cables. From thence, the direction of the river is south-west, but at about 2 miles within the entrance the channel is obstructed by sand banks in places nearly dry at low water springs. (This was in September, during the dry season, when the river was very low.)

Although there is no bar, the great depth of water immediately outside the mouth of the river, changes suddenly to 3 fathoms, causes dangerous overfalls, especially when the wind is blowing from the eastward, rendering it at such times unsafe for a boat to attempt to enter, the sea breaking right across. The ebb runs stronger near the mouth of the river than a row boat could stem.

The entrance is not easily made out until abreast of it, and there are several smaller openings both north and south. The muddy water from the river extends into deep water, and the clearly defined line where it meets the blue water is very noticeable.

Inland Navigation.—About 2 miles within the mouth of the river sand banks commence, which obstruct the navigation, rendering it intricate, the channel being narrow, with a depth of only 5 or 6 feet in places, and here and there running abruptly from one side of the river to the other. The navigation of the Rovúma depends much upon the season, it being highest in March and lowest in about October. Mr. May ascended the river 30 miles in H.M.S. *Pioneer* in March; the water subsided in the middle of the month, but rose again nearly to its former height at its end. Mr. May's examination of the river was made between these periods, and at his turning point there appeared to be no impediment to further progress, but the water beginning to fall rapidly induced him to return to the

entrance, in doing which a depth of 5 feet only was carried over the shoal patches. The stream ran 3 knots.*

Dr. Livingstone ascended the river in boats 156 miles, in September 1862, and proceeded to just below Nyamatolo island, lat. $11^{\circ} 53' S.$, long. $38^{\circ} 36' E.$, about 114 miles as the crow flies from the coast. The river was unusually low, entailing frequent dragging of the boats at the shallow parts. The ascent of the river occupied 15 days, and its descent 10 days.†

The bed of the river is about three-quarters of a mile wide, flanked by well wooded table land, apparently ranges of hills 500 feet high; sometimes the spurs of the hills come close to the river, but there is generally about one mile of alluvial soil between the high land and the bank.

About 60 miles up the river the table land recedes, and there is an immense plain with detached granite rocks and hills dotted about it; here some rocks appear in the river. At Nyamatolo island, the farthest point reached by the expedition, the bed of the river is all rocky, the water rushing through numerous channels between rocky masses 4 or 5 feet out of water. Canoes go through these channels with ease, and the expedition might have taken their boats up, but they were informed that the channels were much narrower farther up, and that it was likely they would get them smashed in coming down.†

The distance from Ngomano, 30 miles above Nyamatolo island, to the Arab crossing places of lake Nyassa Tsenga or Kotokota, was said to be 12 days' journey. The Liendi enters the Rovúma at Ngomano; it rises in the mountains on the east side of lake Nyassa. The great slave route to Kilwa is or was along the banks of this stream, which is only ankle deep in the dry season.

Natives.—There are but few people near the mouth of the river, and they are shy and timid, but farther up there are numerous villages, some on sand banks in the river. The natives fired with muskets and bows and arrows at the expedition, taking advantage of their having to pass a narrow passage under a high bank, but upon the fire being returned they desisted.†

The Tsetse fly is met with along the Rovúma, and the people in consequence have no cattle.

Supplies.—Only a scanty supply of provisions is to be obtained from the natives. The water of the river affects people at first, but

* D. May, Master, R.N., 1861.

† Dr. Livingstone, 1862.

not after being accustomed to it. Wood for steamers may be easily procured.

MSIMBATI CHANNEL.—From Ras Matunda the coast and reef take a north-north-west direction for 4 miles, to Ras Ruvura ; the reef, which is steep-to, extends from one-half to three-quarters of a mile from the shore. The reef at Ras Ruvura is broken by Msimbati channel, about three-quarters of a mile wide, with depths of about 30 fathoms, and leading into Mnazi bay.*

From the west side of entrance to this channel, a reef nearly 2 miles in width protects Mnazi bay, extending 10 miles to the north-westward, to a point $1\frac{1}{4}$ miles north-eastward of Ras Sangamku, where it turns westward to Mikindani bay.

There are two islands on this reef. Mongo, the larger of the two, is low, thickly wooded, and has a number of tall trees near its north-west extreme that show well from the northward. An island named Nakitumbi is connected to it by a bank of sand which dries at a quarter ebb. Mana Hawanja, the eastern islet, is also low and covered with trees.

MNAZI BAY is a large sheet of water within the coral reef which surrounds the islands of Mana Hawanja and Mongo, the entrance to which is by Msimbati channel. This bay is about 8 miles long in a south-east and north-west direction, and about 5 miles wide from the entrance to Mnazi village ; its extremes are shallow but the middle is clear, with depths of from 7 to 16 fathoms, sand and coral. A bank of sand and coral, extending from a half to $1\frac{1}{2}$ miles off shore, fringes the bay from Ras Msimbati to Ras Sangamku, which makes landing difficult, unless at high water, when it is practicable at Mnazi village.

Fungu Achumbu is a coral reef, $1\frac{1}{4}$ miles in length, dry in patches at low water ; its north end lies W. by N., about one mile from the conspicuous tree on Ras Msimbati. At 3 cables eastward of the north end of Achumbu is a small patch, awash at low water, with deep water between. A small coral patch, dry at low water, lies nearly one mile N.W. of the conspicuous tree ; this patch is on a bank of sand and coral, 8 cables in extent, nearly in mid-channel, and upon which the depths vary from $1\frac{1}{4}$ to 5 fathoms.

There are several other shoals in Mnazi bay, but the seaman must be guided by the eye, the lead, and the chart, if intending to thread his way to an anchorage off the village of Mnazi.

* See enlarged plan of channel and anchorage of Msimbati, on coast sheet No. 690.

Mnazi is a small village in the south-west bight, from which the bay derives its name ; the population in 1875 was about 300, but there are more people in the neighbouring plantations, who bring the produce of their fields, &c. to Mnazi for barter with traders from Mikindani.

Supplies.—A few fowls, eggs, and goats are to be obtained from the villages between cape Delgado and Kiswere harbour.

Mangrove wood for steaming purposes can be procured on any part of the coast, but if native labour cannot be obtained, it is as well, if possible, to shun the fever breeding swamps in which the mangrove generally thrives.

Water for boats employed cruising may be obtained from the well at Keonga (p. 277), and also from a well near the coast about a quarter of a mile northward of Ras Msimbati in Mnazi bay, but there is no place between cape Delgado and Mikindani bay where a vessel could obtain water with facility.

Directions.—In entering Mnazi bay do not close the Msimbati or south-eastern shore nearer than $1\frac{1}{2}$ miles until a conspicuous tree standing alone on Ras Msimbati, bears S.S.W. $\frac{1}{2}$ W. ; this bearing kept on leads in until the south extreme of Mana Hawanja island bears N.W. ; then steer S.W. $\frac{1}{4}$ W. (to avoid a coral patch of $1\frac{1}{4}$ fathoms, which extends $2\frac{1}{2}$ cables off shore, northward of Ras Msimbati), until the tree bears South, when it can be steered for, anchoring as convenient in from 10 to 15 fathoms, sand.

Should the wind be blowing fresh from the northward, a better anchorage will be found southward of Mana Hawanja island ; to reach this anchorage steer in S.S.W. $\frac{1}{2}$ W., as before, for the conspicuous tree on Ras Msimbati until the south-west point of Mana Hawanja island bears N.N.W., then steer N.W., and anchor in from 10 to 13 fathoms as convenient.

Tides.—It is high water, full and change, in Mnazi bay, at 4h. 0m. ; springs rise 11 feet. The stream in Msimbati channel runs from 4 to 5 knots at springs, with heavy overfalls off the point of the reef extending south-eastward of Mana Hawanja island.

There is very little tidal stream felt in Mnazi bay; outside, however, the stream takes the direction of the coast, the ebb running to the north-westward and the flood south-eastward, with a velocity of from 2 to 3 knots an hour at springs, and strongest near the reefs.

MIKINDANI BAY lies between Ras Sangamku and cape Paman, and is about $4\frac{1}{2}$ miles wide between the reefs. The shores

of the bay are fronted by coral flats, which extend from a half to $1\frac{1}{2}$ miles off, and dry in patches at low water springs. Abreast Ras Sangamku, the eastern point of the bay, the flat extends off $1\frac{1}{2}$ miles. The only anchorage is on the east side, between Shangani shoal and the coast reef. Mikindani bay may be readily identified from seaward by Mlima Mjoho, a remarkable conical hill 617 feet high, covered with trees, and also, if within seven miles of the entrance, by Hull rocks, 62 feet high, at the north point, a curious mass of conglomerate coral, covered with brushwood. Both sides of the bay are low, and thickly wooded, while at the head, over Mikindani harbour, the hills rise to a height of from 400 to 550 feet.*

Shangani shoal is a small patch of coral and sand, lying in the fairway of the entrance to Mto Mtware, with deep water all round it; on the shoalest part the depth is 3 fathoms, from which Ras Richemerero bears S. $\frac{1}{2}$ W. distant 2 miles nearly.

MTO MTWARA.—This spacious and well sheltered-harbour, $3\frac{1}{2}$ miles in length, by $1\frac{1}{2}$ miles in breadth, with good anchorage in from 6 to 14 fathoms nearly all over it, lies on the south-east side of Mikindani bay, the entrance being from one to 2 cables wide, between Mwamba Ribunda and Mwamba Shangani, the coral flats fronting the coast on either side. The channel is not so tortuous as that into Mikindani harbour.†

Messemo sand spit on the east side of the channel, and about $1\frac{1}{2}$ miles within the edge of the reefs, is steep-to; having rounded this spit, the full extent of the harbour is seen. On the south side of the harbour is Mto Pwazie, a creek extending about 2 miles to the southward, when it becomes lost in the mangrove.

Anchorage.—The best berth for a short time is near Messemo spit, in 14 fathoms, sand, with the end of the spit bearing N.W. by W. $\frac{1}{2}$ W., and the small cliff S.W. If intending to make any stay, there is better anchorage farther up the harbour, in from 7 to 10 fathoms, mud.

There are several patches of coral and sand in the harbour with from $1\frac{3}{4}$ to 5 fathoms water on them, for which, see the plan.

Directions.—To enter Mto Mtware, keep Hull high rock, bearing S.E. $\frac{3}{4}$ S., astern, until Ras Sangamku bears E. by N. or the highest tree (129) bears E.S.E., to avoid Shangani shoal; then bring the remarkable tree (Finger tree), from which the lower branches were

* See Admiralty chart:—Mikindani bay, with views, No. 684, scale, m = 2·0 inches.

† See plan of Mto Mtware entrance and view, on sheet No. 684; scale, m = 3·0 inches.

cut off in 1874, to bear S. by E. and steer for it on that bearing, between the reefs, until Messemo sand spit bears S.S.W. $\frac{1}{4}$ W., or Mjoho shoulder (with high trees on its summit) is in line with Button rock, then steer for Messemo village, borrowing a little on the eastern shore ; thence as requisite to the anchorage.

Ras Richemerero, the west point of entrance, kept bearing eastward of South, until the highest tree, before-mentioned, bears E.S.E. also leads westward of Shangani shoal.

When past Ras Richemerero, if entering on the flood tide, keep well over on the eastern side, and if with the ebb running out, keep towards Mtwara village to allow for turning, as the stream runs sharply round Messemo sand spit from $2\frac{1}{2}$ to 3 knots an hour.

With a good look out aloft there is no difficulty in entering the harbour with the sun astern, the eye and colour of the water being the best guides, as the marks given are none of the best.

Supplies.—There are three villages on the shores of the harbour, but neither food nor water can be obtained in any quantity.

Tides.—It is high water, full and change, at Mto Mtwara harbour, at 3h. 45m. : springs rise 12 feet ; the tides run strong at the western anchorage, and also in the channel.

Misete Creek lies between Mto Mtwara and Mikindani harbour ; its entrance is about $1\frac{1}{2}$ cables in breadth between Mwamba Dadi and Mwamba Shangani, with depths of 4 to 10 fathoms.

From the entrance, the creek extends southward for $1\frac{1}{4}$ miles, expanding into a basin nearly half a mile across, with depths of $1\frac{1}{2}$ to $2\frac{3}{4}$ fathoms, sand and pebbles. A small vessel would be well sheltered here, but with the harbours of Mikindani and Mto Mtwara so near, the seaman would have no object in pushing into such a confined space. About half a mile from the head of Misete creek is a large sandy plain, which probably covers at high water spring tides.

MIKANDANI HARBOUR, generally known as Pimlea harbour, lies at the head of Mikindani bay ; it affords secure anchorage in from 6 to 8 fathoms, mud. It may be recognised by a group of light coloured trees on the east side of the entrance, with a dark tree in the middle of them, which is conspicuous at all times. The observation spot on the south shore of the harbour is in lat. $10^{\circ} 16' 31''$ S., long. $40^{\circ} 7' 33''$ E.*

* See plan of Mikindani harbour entrance, and view on sheet No. 684 ; scale, m = 4·0 inches.

Dangers.—At $2\frac{3}{4}$ cables S.W. by W. $\frac{1}{2}$ W. from Pemba point is a rock with less than 6 feet at low water springs ; and in the south part of the harbour, 3 cables N.N.E. of the custom house, are two rocks awash at low water, with $4\frac{1}{2}$ fathoms between them ; a third rock lies nearly 2 cables from the custom house on the latter bearing.

Directions.—To enter Mikindani harbour from the northward, after passing Hull rocks at the distance of half mile, a S. by W. $\frac{1}{2}$ W. course leads up to about one mile east of Ras Managumba, a sharp rocky point with two villages northward of it, on the west side of the bay. Thence steer S.W. until the clump of large trees on the east point is in line with the high trees on a conical peak inside the harbour, bearing S.W. $\frac{1}{2}$ S., southerly. This bearing should be kept on until the fort (a low white building with a large door in the middle facing the harbour entrance) is open of Pemba point ; then steer S.W. $\frac{1}{2}$ W., which leads to the centre of the harbour.

The above remarks are offered only to assist in piloting a vessel into the harbour, but the channel is so narrow that a vessel is more easily conned by eye when the sun is in a favourable position ; the reefs on either side show at low water. When within Gunia point, the narrow entrance opens out into a spacious bay, the greater part of which is shallow.

Anchorage.—The best anchorage is in $6\frac{1}{2}$ fathoms, mud, with the fort bearing W. $\frac{1}{2}$ S., and the custom house S.W. by S.

Tides.—It is high water, full and change, at 3h. 50m. ; springs rise 12 feet. The tidal stream in the harbour is scarcely perceptible.

Supplies.—Although there are several villages upon the shores of the harbour, no supplies were to be obtained, with the exception of a few fowls, (1875) ; there were neither cattle nor sheep in the vicinity ; fresh water is both scarce and bad.

Trade.—There are a few Banians at Mikindani, who trade with the tribes three or four days' journey into the interior, sending cloth, brass wire, muskets, beads, &c., and receiving in exchange, gum-copal, ivory, seeds, and rice.

COAST.—From cape Paman, the north-west point of Mikindani bay, the coast to Mgau Mwania 10 miles to the north-westward is low and bordered by a reef extending from three-quarters to $1\frac{1}{2}$ miles off ; the only remarkable feature is a black clump of trees 80 feet high, $3\frac{1}{2}$ miles beyond cape Paman. When off Mgau Wania, Mlima Mjoho, 617 feet high will show as the southern extreme of the hilly range.

From Mgau Mwania to Lindi river, about 16 miles farther to the north-west, the coast continues low, with a reef extending from a half to $1\frac{1}{2}$ miles off.

The coast from Ras Kera, 8 miles northward of Lindi, to Machinga bay, is low, with a few off-lying mangrove islets on the reef, which extends about one mile off, but the land at the back is bold near Ras Kera. A similar reef fronts the coast southward of Ras Kera.

The coast from Mchinga to Mzungu is also low, with numerous off-lying mangrove islets on the reef. Inland, 2 or 3 miles distant, a wooded range 400 feet high extends parallel to the coast. From Mzungu to Kiswere harbour the coast is rocky.

MGAU MWANIA (Mungulho river).—The entrance to this river may be easily distinguished by the break in the land, when the river comes open on a south-westerly bearing, and also by the Madjovi or Mushroom rocks, on the western reef, 4 cables from the shore. These rocks are three in number, the southern and largest of which is 15 feet above high water, and shaped like a mushroom; at low water the reef dries around, and for 2 cables outside them.*

Off the eastern side of the entrance to Mgau Mwania, Fungu Chosan extends $1\frac{6}{7}$ miles; off the western side of the entrance, Fungu Gomani extends $1\frac{1}{2}$ miles, and dries in patches at low water. With the exception of Nymphe shoal, the approach to the river is clear between these reefs, with a nearly straight channel of from 6 to 12 fathoms depth, and 2 cables width.

Position.—Madjovi rock, on the west side of entrance, is in lat. $10^{\circ} 6' 43''$ S., long. $39^{\circ} 59' 14''$ E.

Nymphe shoal, about half a mile in extent, with a least depth of $2\frac{1}{2}$ fathoms, lies in the fairway of the river, with the high Madjovi rock bearing S.W. $\frac{1}{2}$ W., distant $1\frac{1}{2}$ miles.

A rocky patch, one cable in extent, lies S.W. by W. 4 cables from Ras Swa-Swa, its eastern edge being 2 cables from the western bank. Another patch lies E. by S. $\frac{1}{2}$ S. distant about half a mile from Ras Mgambera, near Sudi village; it is about three-quarters of a cable in extent, and its north-eastern extreme is nearly in the middle of the river.

Kisiwa Jamadayah.—At about one mile above Sudi village is the small island Kisiwa Jamadayah, south of which the river is not navigable for vessels.

Anchorage may be had in 9 fathoms, sand and coral, within Nymphe shoal, with the high Madjovi rock bearing S.W. $\frac{1}{2}$ W., and the south-west extreme of Mkiya village S. by W. $\frac{1}{2}$ W., but in the

* See plan of Mgau Mwania, with views, on sheet No. 681; scale, m = 3'0 inches.

north-east monsoon period, this anchorage is much exposed to wind and sea.

There is good anchorage off the south end of Mwania village, about mid-river, in 9 fathoms, mud, and also at a quarter of a mile S.S.W. of Ras Swa-Swa, in 6 fathoms, mud.

Directions.—Proceeding for the river, do not close the coast within $2\frac{1}{2}$ miles, until the custom-house, a large white building in Sudi, is open, soon after a small sand beach to the right of it should be seen. The west extreme of this sand beach in line with the gap in the distant hills (*see* view on sheet No. 681), bearing S.W. by S., clears the west end of Nymphé shoal, and leads up to the entrance of the river. When Madjovi high rock bears S.W. by W., edge to the eastward until the custom house is its own width open of the sand spit extending from Ras Swa-Swa,* which will lead up in mid-channel to the anchorage off Mwania.

If bound to the anchorage southward of Ras Swa-Swa, keep as nearly as possible in mid-channel, to avoid the spit which extends nearly a quarter of a mile from that point, and also the rocky patch lying S.W. by W. of it, on the opposite side of the channel.

Tides.—It is high water, full and change, at Mgau Mwania at 3h. 45m.; springs rise 12 feet; off the entrance the flood runs to the northward, and the ebb to the south-eastward, with a force of from 2 to 3 knots, the flood being stronger during the south-west monsoon.

Villages.—There are several villages on the banks of Mgau Mwania; on the east point of entrance is Mkiya, and about a third of a mile farther in is the larger village of Mwania. Sudi, where the governor of the district resides, is on the west bank of the river, within Ras Swa-Swa, or about 3 miles from the entrance. The people are poor but civil and well disposed.

Supplies.—No supplies are obtainable in the river; Sudi is the only village with good water.

LINDI BAY, the entrance to which is between Ras Shuka (Clarkson point) and Ras Banura (Kiremba point), is $5\frac{1}{2}$ miles deep, and at the entrance between the reefs nearly 3 miles wide. The depths in the outer part of the bay vary from 50 to 250 fathoms, the coast reefs being steep-to, while in the inner part, westward of a line drawn between Ras Ekapapa and Ras Rungi (Esmanti point), the water shoals rapidly.†

* The extreme of this sand spit is not to be relied on; probably the gap in the distant hills in line with custom house is a better mark.

† See plan of Lindi river, and Magau Mwania, with views, No. 681; scale, m = 3·0 inches.

On the north side of the bay the coast reef in places extends a quarter of a mile, and at Ras Shuka on the south side, it extends nearly half a mile, but thence westward to Ras Rungi, it does not exceed 3 cables from the shore.

The outer edge of Fungu Myangi north of Ras Shuka, is composed of dead coral and boulders, forming a ridge, the top of which is covered at three-quarters flood, and on it the sea at times breaks heavily.

Approaching from the eastward, the land about Lindi bay cannot be mistaken as it is the highest on the coast between Zanzibar and Mikindani; the hills over the western shore, rising to a height of 976 feet, are well wooded, and cultivated in patches. Mlima Mdemba, 947 feet high, has a grove of cocoa-nut trees on its summit.

Approaching from the northward or southward the great indentation in the coast, together with the high hills over the western shore, is sufficient to indicate its position.

Utamar shoal, the outer extremity of the shoal water extending northward of Ras Nando, the west point of Lindi river, lies N. by W. $\frac{1}{2}$ W., $1\frac{1}{8}$ miles from Ras Rungi. It is $1\frac{1}{2}$ cables long, two-thirds of a cable wide, with a least depth of $1\frac{1}{2}$ fathoms at low-water spring tides. The water deepens rapidly at half a mile eastward of the shoal.

Anchorage.—Fair anchorage may be had in Lindi bay during the north-east monsoon between Ras Ekapapa and Ras Mungu on the north side of the bay, in 8 fathoms, mud, with the south extreme of land to the eastward bearing E. $\frac{3}{4}$ N., and Ras Rungi, S.W. by S. $\frac{1}{4}$ S. If intending only to remain a short time, good anchorage may be obtained in 5 fathoms, mud, off Ras Rungi, with centre of Mwentengi village bearing S.S.E. $\frac{1}{2}$ E., and Ras Rungi S.S.W.

The best anchorage, however, as regards holding ground, shelter, and convenience for vessels of moderate draught visiting Lindi, is half a mile north-eastward of the town, with Ras Rungh bearing S. by W. $\frac{3}{4}$ W., and Lindi fort, West, in 9 fathoms, sand and mud.

Tides.—It is high water, full and change, in Lindi river, at 4h. 5m.; springs rise 11 feet. The tidal streams in the bay, outside the bank of soundings are not strong, but within Ras Rungi they run from 2 to 3 knots, the ebb being very strong during the rainy season, when a vessel seldom swings to the flood.

Directions.—Bound to Lindi from the northward, the coast should be given a berth of one mile, until abreast of Ras Banura, a

small cliffy point 25 feet high, the north-east point of the bay. From this position, Lindi fort,* a stone building, under the cocoa-nut trees of the town, with a white house to the eastward of it, will be seen bearing W.S.W. See view on plan No. 681.

Steer for the fort, keeping it well open of Ras Rungi, which clears the reef off Ras Nongerungo (Putuani point). Soundings will not be obtained with the hand lead until the centre of Mwentengi village, bears eastward of South, when anchorage may be taken as before directed.

If intending to enter the river steer to pass within half a cable of Ras Rungi, which is bold to.† When Ras Rungi is abeam, steer W. by N. to clear the bank extending westward of it, taking care not to shut in the last extreme of Mwentengi village with Ras Rungi, until Ras Rungh (Entrance point) bears S.S.W. $\frac{1}{2}$ W., or Mlima Atu appears in the middle of the river, when steer in mid-river, and anchor as convenient.

If wishing to proceed farther up, Ras Rungh may be rounded at one cable distance, and keeping on the east side of the river, a vessel may anchor a little northward of the watering place, but the holding ground is not good.

LINDI RIVER.—The entrance to the river is between Ras Nando and Ras Rungh whence it trends about S.W. by S. for $3\frac{1}{2}$ miles to Gala island, the width varying from 7 to 3 cables. From Gala island (the farthest point reached in the survey made by H.M.S. *Nassau* in 1874), the river takes a south-westerly direction for three miles, when it branches into several reaches. The principal one, named M'Tali river, takes a south-easterly direction for 3 miles, thence, about south-west, with many bends, for a distance of 10 miles, beyond which the boat could not proceed.

The M'Tali river terminates at this point in a sandy plain, across which slave caravans travelled upon the road to Lindi. At six miles above Gala island, upon the eastern bank, is the village of Nyandi; the river is stated to be navigable at half tide for vessels drawing 6 feet.

For entering the river, see above.

Sand Bank.—Off Ras Nando, the west point of entrance to Lindi river, is a sand bank which dries 4 feet at low water, extending E.N.E. $4\frac{1}{2}$ cables from the point. The eastern edge of this bank takes the direction of the stream, forming a narrow spit, between which

* The fort is partly hidden by the trees; the white house must not be mistaken for it.

† The depth abreast Ras Rungi should be ascertained before attempting to proceed to the town; as in 1888, a bar, with from 13 to 15 feet at low water, apparently extended right across.—Berlin, Heft 1, 1889.

and the shore the depths are from $1\frac{1}{2}$ to 2 fathoms. A cask buoy marks the eastern edge of this spit, with the fort bearing W. by S.

Fungu Mbachiwonaki is a bank of coral and sand 5 cables long, on the western side of the river, dry at half tide. Its north extreme lies abreast of Ras Rungh, distant $2\frac{1}{2}$ cables. There is a channel for dhows to the westward of the bank.

Kisiwa Nunyi is a mangrove island half a mile in length, on the west side of the river; between it and the west bank is a boat channel three-quarters of cable wide. Shallow water, 3 fathoms and less extends about 3 cables from its east side, and mud spits extend some distance from its north-east and south-west extremes.

Lindi.—The town of Lindi consists of about 500 wood and straw huts, built under a grove of cocoa-nut trees, the old fort, which is in a very dilapidated condition and has no guns mounted, being on the north-west side of it. The population in 1874 was about 2,000. The observation spot at the fort is in lat. $9^{\circ} 59' 30''$ S., long. $39^{\circ} 43' 41''$ E.

Imports.—European goods, hardware, &c., are imported, sent into the interior, and exchanged for gum-copal, rice, mtama seed, skins, vory, &c. Nearly all trade is conducted by the Banians, who are to be found at most of the places on the coast. For some miles round Lindi the country is well cultivated, rice, mtama seed, manioc, &c., being grown in abundance.

Supplies.—About Lindi there are a small number of cattle belonging to the Banians, but they will not sell; there are no sheep; fowls, eggs, and goats, are to be obtained in small quantities, though not sufficient to replenish the stock of a moderate-sized vessel. All vegetables are scarce, and as the natives principally subsist on them, they also are difficult to obtain.

Water.—There are several wells in Lindi, but the water is brackish. Good water may, however, be obtained at the watering place on the east side of the river, from a spring which passes under a turreted stone house just inside the mangroves, but it would be difficult to get in large quantities, except at high water, when boats could go up the creek.

THE COAST.—**Mto Mbanja** is situated 3 miles northward of Lindi bay, and may be known by a large gap in the hills; inside the mouth, the water shoals to 3 feet. Dhows can enter the river at all times of tide. There is no anchorage off the river.*

Ras Kibungwe, at 2 miles northward of Mbanja, is a wooded point

* See Admiralty chart:—Cape Delgado to Kilwa, No. 1808.

50 feet high ; at half a mile to the northward of the point is an islet closely resembling it.

Mto Kera is a small river immediately south of the point of that name. Between the reefs at the entrance there is a depth of 4 fathoms ; but the mouth is so narrow that a heavy swell caused by the surf on either side, rolls in and makes it dangerous even for boats to enter. Ras Kera is a bold looking mangrove point.

MCHINGA BAY (port Nungwa), lying between Ras Mzinga and Ras Rokumbi (Nungwa point) is about one mile wide, with depths near its head of from 3 to 8 fathoms ; it may be known by the gap shown by the Mto Naingaru, at its head, and the mangrove islets on the coast reefs extending from the two points of entrance. These reefs surround the points and both the north and south sides of the bay, to the distance of a half to three-quarters of a mile.*

The town of Mchinga is in the north-west corner of the bay, and stands in a cocoa-nut grove. The chief resides at Mchinga village on the south shore. No supplies or water are obtainable.

Position.—The observation spot, north of Mchinga village, is in lat. $9^{\circ} 44' 22''$ S., long. $39^{\circ} 44' 7''$ E.

Mto Namgaru.—The entrance to this stream, at the head of Mchinga bay, is blocked by the Fungu Namtamwa which only admits boats at high water. It was not explored, but the chief stated that its waters were salt, and that a canoe could ascend it in three days journey.

Anchorage.—There is anchorage near the head of Mchinga bay, in 3 fathoms, sand, with Ras Mzinga S.E. $\frac{1}{2}$ E., and Ras Rokumbi N.E. $\frac{1}{4}$ N. ; in this position a vessel is partly sheltered by the Mwamba Mahazamu, from the swell which is thrown into the bay at all seasons. There is deeper water to the north-eastward of this position.

Directions.—In entering Mchinga bay, keep the gap made by the Mto Namgaru, bearing West ; no soundings will be obtained with the hand lead, until the tall mangroves on the south shore bear S. by W., when the depth suddenly decreases from 50 to 10 fathoms, after which, anchor as convenient.

Tides.—It is high water in Mchinga bay, full and change, at 4h. 0m. ; springs rise 12 feet.

THE COAST.—Nondo and Ruvu bays are both shallow indentations of the coast. There is no anchorage in these bays, as the water is deep close to the reef which borders the coast at a distance of 3 or 4 cables. There are no dangers outside the reef.†

* See Admiralty plan :—Mchinga bay, with view, No. 677, scale, m = 40 inches.

† See Admiralty chart :—Cape Delgado to Kilwa, No. 1808.

Mzungu bay.—Mto Bwamkuro discharges itself in the north part of Mzungu bay; during the rainy season the water is discoloured one mile seaward. A sand bank bars the entrance of the river to boats at low water, and on a rising tide there are heavy overfalls.

Fair anchorage may be obtained in the southern part of Mzungu bay in 9 fathoms, sand and coral, with Ras Bwamkuro bearing N. by W. $\frac{3}{4}$ W., and centre of village S.W. $\frac{1}{2}$ S.

KISWERE BAY, between Ras Bwamkuro (Masongo) and Ras Fughio (cape Nourse), is clear of danger with the exception of the coast reefs. Ras Bwamkuro, the south point of the bay, is 20 feet high; the reef extends from it 2 cables, and thence along the coast round Grant point, and the swampy shore within it at nearly the same distance to Ras Bobare. The shore facing eastward is backed at three-quarters of a mile inland by a flat range of hills 300 feet high.*

Ras Fughio, the north point of the bay, is 29 feet high; the reef here closes within one cable of the point, and then with several islands on it skirts the coast at a distance of 3 to $1\frac{1}{2}$ cables southward of Ras Berikiti. The coast hills about three-quarters of a mile within Ras Fughio range about 150 feet high.

The water will be found slightly discoloured on approaching the bay.

Anchorage.—There is no anchorage until within half a mile of the harbour, when the soundings rapidly decrease from 25 to 13 fathoms.

Mlima Mamba.—The most remarkable features on approaching, are, Mlima Mamba (Piccolomini hill), a conical hill 419 feet high, $1\frac{1}{2}$ miles inland; and Pandawi, a conspicuous square cliff, on the coast at the head of the harbour, which bears W. $\frac{1}{2}$ N. when the entrance is open.

At a short distance from the coast the hills are of moderate elevation, the table land to the northward rising to a height of from 200 to 350 feet.

KISWERE HARBOUR is quite clear at the entrance, which lies between Ras Berikiti (Harbour rocks) and Ras Bobare; a coral reef, dry at half tide, extends $1\frac{1}{2}$ cables off Ras Berikiti, having 4 fathoms water close-to. Ras Bobare, on the extreme of which is a clump of mangroves, has a reef extending about $1\frac{1}{2}$ cables off.†

* See Admiralty plan :—Kiswere harbour, with view, No. 687, scale, $m = 3\cdot0$ inches.

† See Admiralty plan :—Kiswere harbour, with view, No. 687 scale, $m = 3\cdot0$ inches.

Within the 5-fathom line, the soundings decrease gradually to the bar of the river which stretches across the north-west corner of the harbour; the sea occasionally breaks heavily on the bar.

Position.—The observation spot at Rushungi village, is in lat. $9^{\circ} 25' 36''$ S., long. $39^{\circ} 36' 31''$ E.

Directions.—Anchorage.—When approaching Kiswere harbour, if towards low water, the sea will probably be observed breaking on the bank inside, and on the coral reef off Ras Berikiti, which, when recognised, may be rounded as close as convenient. A good mark for entering about mid-channel, is the small red cliff on the south side of the harbour, in line with a distant peak bearing W. by S. $\frac{1}{2}$ S. (*see view on plan*), until Milima Ruhaha, a remarkable hill to the north-westward, with a large tree on its summit, is nearly touching the west point of the inlet, or the conspicuous sandy beach on the north shore bears N. by E., when a vessel may anchor in 4 fathoms, stiff mud. The holding ground here is good, and this would probably be the best anchorage in either monsoon.

Supplies.—In the south-west corner of the harbour is a small fresh water stream, up which a boat can go at half tide to the large village of Kiswere, where a few supplies, such as goats, fowls, eggs, &c., may be obtained, but there are no cattle or sheep in the vicinity. The natives are civil and well disposed, but indolent, and only cultivate ground sufficient for bare subsistence.

Water.—There are wells of water at the village of Mtumbo, in the inlet, but it is brackish and unfit for use by Europeans.

Tides.—It is high water in Kiswere harbour, full and change, at 4h. 25m.; springs rise 12 feet.

The inlet or arm of the sea, in the north-west corner of Kiswere harbour, trends north-west for about 2 miles, and then divides into two branches, the southern one being shallow; the other branch runs generally about N.N.W. for $2\frac{1}{2}$ miles, to the fork, in the western arm of which is the landing place. From the western point of the entrance nearly up to the fork, a distance of $4\frac{1}{2}$ miles, 3 fathoms water may be carried, but above it the inlet becomes insignificant, and there is a patch of rocks in mid-channel a mile below the fork. The banks are mostly mangrove swamps, with higher, well wooded, and partially cultivated land in the background to the eastward, but to the westward the country for about a mile inland is inundated at high water spring tides.

The anchorage off the village of Mtumbo is only fit for small vessels, as the bar across the entrance of the inlet has only 6 feet at low water springs.

A bank about 2 cables in extent, awash at low water springs, lies on the eastern part of the bar, one mile W. $\frac{3}{4}$ N. from Ras Berikit.

A good mark for entering, is Mlima Ruhaha in line with the west point of the inlet, until Pandawi cliff bears S.W. by W. $\frac{1}{2}$ W., then edge to the eastward, which is the deeper side, and anchor as convenient off the village.

COAST.—From Ras Fughio, 29 feet high, the north point of Kiswere bay, the coast trends nearly in a straight line, with sandy beaches and small off-lying mangrove islets on the reef, to Ras Mombi, the southern point of Roango bay.*

Roango bay is about 9 miles northward of Kiswere bay ; it is a shallow indentation of the coast, not distinguishable 3 miles off. There is no anchorage for vessels, but a narrow boat channel, having 3 feet at low water, leads through the reef to a creek in the centre of the bay, which creek affords shelter to dhows. There is a small village on the sandy beach in the south-west corner of the bay, unapproachable by boats except at high water. A few fowls may be obtained.

The coast from Roango bay is rocky with sandy bights to Ras Ngumbe Sukani, the latter being the highest point on this part of the coast ; it may be known by being immediately southward of two rocky islets, 20 feet in height, and if approached during the morning a white patch will be seen on its upper part. From Ras Ngumbe Sukani to Mto Pawi, the coast consists of a mangrove swamp with several creeks, leading to Pawi creek ; the mouths of these creeks are not distinguishable from seaward. The reef between Kiswere bay and Mto Pawi is steep-to bordering the coast at a distance of 3 to 4 cables.

Mto Pawi, which separates the south end of Songa Manara island from the main, is a boat channel available only at high tide with smooth water, and communicates with Pawi or Mkurulengamunyu creek the southern arm of Sangarungu harbour. It is not distinguishable from seaward, being overhung with mangroves ; but the south point of Songa Manara may be known by a remarkable break in one of the projecting cliffs, which, when seen from the southward, appears like an island. The sea, when there is much swell, breaks through this cleft with great violence, throwing the spray to a considerable height, and giving the appearance of white smoke rising from the land.

* See Admiralty chart :—Cape Delgado to Kilwa, No. 1808

Songa Manara island is low, with an indented rocky coast line trending north for $3\frac{1}{2}$ miles from Mto Pawi to Ras Kivurugu, its eastern point; thence the coast trends north-westward $4\frac{1}{2}$ miles to the entrance of Sangarungu harbour. There are many groves of cocoa-nut trees on the island, and a particularly tall clump on Ras Kivurugu assists in recognising it. The island is skirted by a reef which off Ras Kivirugu extends for nearly one mile, and the edge is everywhere steep-to.*

There are several villages on Songa Manara island, of which Sanji-ya-Majoma is the principal; also the remains of Portuguese and Shirazi stone houses and towers.

Kivurugu islets are three low bushy islets, situated on the reef off Ras Kivurugu; the outer one lies close to the edge.†

SANGARUNGU HARBOUR represents a large sheet of water, but is of little use as an anchorage. The harbour is surrounded by mangroves, encumbered by many reefs, with violent tidal streams, and the swell reaches far into the interior, so that a vessel having to go some distance in for a secure berth, renders it inconvenient. It has no proper rivers discharging into it, though many ramifications in the shape of mangrove creeks are used by the natives for local trade; but Kilwa being so near, any trade from a distance finds an exit there.

The Channel into Sangarungu harbour is three-quarters of a mile across from reef to reef, deep, perfectly clear, and open to the north-east. The reefs dry at low water, and off Songa Manara island are some mangrove bushes close to the edge of the reef and distant three-quarters of a mile E. by N. of Ras Sangarungu, which can always be seen. On this side the reef is very steep, but the other shoals off for about one cable. Ras Sangarungu, the northern point of Songa Manara, is sandy, crowned with high cocoa-nut trees and faced with mangroves. Ras Mchangamra on the opposite side of the channel is low, and composed of mangroves. At springs the tides in this channel are very strong.

Caution.—The water in Sangarungu harbour is very thick and muddy, and the dangers cannot be seen.

Port Nisus.—Sanji-ya-Kati, with a village on it, is a mangrove island nearly in the centre of the southern branch of the harbour

* The Directions from Songa Manara island northward to Ras Kimbiji (in lat. $7^{\circ} 0' S.$), including Mafia island and channel, are by Commander Wharton, H.M.S. *Fawn*, 1877, adapted to the survey of that year.

† See Admiralty plan:—Kilwa Kisiwani, No. 661; scale $m = 0.9$ of an inch.

(Owen's port Nisus), with an extensive reef stretching northward from it. Between Songa Manara and Sanji-ya-Kati, the harbour is very deep and it is not until southward of the latter island that any convenient anchorage will be found.

Port Pactolus.—The portion of the harbour northward of Sanji-ya-Kati (Owen's port Pactolus), is nearly barred to a large vessel by a sand bank with three fathoms water, extending north 8 cables from the north-east extremity of Fungu-ya-Kati, towards Kilwa island, beyond which is good anchorage in 8 to 12 fathoms mud, but exposed to the swell that rolls in through the wide open entrance.

From this harbour there is boat communication at all times with Kilwa harbour by Mlango Mugongo, a wide passage westward of Kilwa island. A narrow deep channel up this passage terminates without effecting a junction with Kilwa harbour, but it has not been closely sounded.

KILWA KISIWA, the island which separates the harbours of Sangarungu and Kilwa Kisiwani, has a sea face of 4 miles, with a general northerly trend from Ras Mchangamra the south-east extreme, to Ras Kipakoni, where it turns to Kilwa Kisiwani. The shore is sinuous and for the first mile, to Watiro island, is broken into mangrove creeks; it then becomes cliffy, forming a deep bay, on the shore of which is the village of Msokole. The shore in the bight of the bay is sand, but as it sweeps round to Ras Mvinja again becomes cliffy. Kilwa is low and covered with trees; the northern part is a coral plateau elevated 45 feet above the sea and has many huge baobab trees on it.* The reef dries off to distances varying from 2 cables to one mile, following the line of coast, and is steep-to.

KILWA KISIWANI HARBOUR is the lower portion of a large estuary, which extends inland for about 15 miles in a north-west, west, and south-west direction, where the Mavudyi river discharges into it. Port Beaver is situated in this estuary, above Kilwa Kisiwani town; it is a wide arm of the sea, shallow a few miles up, and dotted with islands where it begins to contract to the river Mavudyi, which is said to be navigable for canoes some distance.

The harbour is mostly bordered by mangroves, and has a bad reputation for malaria, but it is no worse than Kivinje, and were the site of the dwelling-houses as a rule better chosen, would be more

* See Admiralty plan:—Kilwa Kisiwani, No. 661, with enlarged plan of the harbour, scale $m = 1\cdot95$ inches.

healthy. It is an admirable one for steam vessels of all classes, and much more adapted for shipping goods than Kivinje, where a vessel must lie $1\frac{1}{2}$ miles from the shore, and at times exposed to a swell.*

Kilwa Kisiwani is the name given (in contradistinction to Kilwa Kivinje, a few miles north) to the village occupying the site of the old town (Quiloa of the Portuguese), and which was for several centuries the most important place on the eastern coast of Africa. The ruins of old Quiloa on the north-western portion of the island are extensive, but are mere foundations, excepting the castle, some mosques, and a large embattled space, the walls of which are still standing. The importance of Kilwa Kisiwani is long a thing of the past, the trade all passing through Kilwa Kivinje.

The village of Kilwa Kisiwani is small, and stands behind the old castle. An Arab, appointed by the Liwali of Kilwa Kivinje, under the government of the Sultan of Zanzibar, is in charge. A few Hindus reside here. The old castle, a tall, keep-like fortress, formerly white, is conspicuous, and the outer walls are in tolerably good preservation.

Castle islet is a mass of mangrove near the edge of the reef off the castle, from which it is distant 2 cables.

Observation spot.—A large baobab tree stands on an open park-like elevated space, 45 feet above the sea, half a mile east of the castle, and marks the observation spot which is in lat. $8^{\circ} 57' 32''$ S., long. $39^{\circ} 30' 50''$ E. The word *Fawn* is cut on the tree.

THE CHANNEL into the harbour is deep, clear, and 4 cables wide between the reefs which front both shores to the distance of 5 to 7 cables; these reefs are steep-to.

Mwamba Rukyira is a tongue of reef stretching off Ras Matuso in an easterly direction for $3\frac{1}{2}$ miles, thence northward for 2 miles, terminating in Rukyira spit from which Ras Matuso bears S.W. distant 4 miles. It is all dry at low water springs, and has many small mangrove bushes and sand heads on its eastern part; one of the latter, situated $1\frac{1}{2}$ miles south of the spit, is always dry. The reef is steep-to on its eastern sides, and the sea always breaks on it.

Cape Kilwa or Ras Matuso on the northern side of the entrance to Kilwa Kisiwani, is low, sandy, and dotted with trees. To the westward the coast is composed of sand and cliff for $1\frac{3}{4}$ miles to Ras Mso, which is cliffty, about 10 feet high, and at the narrowest part of the channel. The channel may be said to commence south of Ras Matuso,

* See Admiralty plan:—Kilwa Kisiwani, No. 661, with enlarged plan of the harbour, scale, m = 1.95 inches.

where the southern portion of Rukyira reef dries off about half a mile, and is steep-to. Near the edge of this reef, southward of Matuso, is a large bush of mangrove, which is conspicuous on approaching the entrance.

Ras Kipakoni.—The southern side of the entrance is formed by Ras Kipakoni, fronted by Kipakoni and Balozi spits, which extend about three-quarters of a mile off, and are steep-to. On the edge of the reef, eastward of Ras Kipakoni, is an islet, 12 feet above high water.

Balozi spit is rather higher than the part of the reef just eastward of it, but from being protected by the Kipakoni, only breaks when the water is low. Ras Kipakoni is low, with mangrove bushes on its western part which project $1\frac{1}{2}$ cables to the northward along the western edge of Balozi spit. From the west extreme of the point to the town, the coast is of a clifly nature, bordered by a narrow belt of mangroves, and a narrow reef which is steep-to.

Between Ras Mso and Ras Rongozi is Mso bay, which is shallow; the shore of the bay is sand, terminating abruptly to the southward in low, rocky cliffs, which are chiefly black, but showing in one part a yellow face. Southward of these cliffs the shore is fringed with mangroves to Ras Rongozi and round into the harbour. A sand and mud bank, dry at low water, extends $1\frac{1}{2}$ cables south-westward of Ras Rongozi, with many tide whirls off it.

The channel separating Kilwa island from the main is at its northern end very shallow, and at low tides fordable; here is a ferry communicating with the island. There is another ferry from the village to a break in the mangroves north of Ras Rongozi.

The base of the Mpara hill, a flat-topped eminence 460 feet high, skirts the northern bend of the harbour; the hill is partially cultivated but mostly covered with jungle.

Anchorage.—The harbour of Kilwa Kisiwani is very deep, but off the castle there is ample anchorage for many vessels in from 9 to 15 fathoms, open to the sea breeze, but completely protected by the projecting points of reef from the heavy swell that almost invariably beats on the outer shore.

A good berth is in 12 fathoms, with the Castle islet bearing W. by S. $\frac{3}{4}$ S., the Castle S.S.W. $\frac{3}{4}$ W., and Ras Kipakoni W. by S. The reef dries off towards this position nearly 2 cables. The tidal streams are strong, and at this anchorage a vessel is often in an eddy, but as the bottom is exceedingly tenacious mud, a short scope of cable can be used and the anchor kept clear. There are convenient depths more northward, but farther from the village.

Outer anchorage.—There is temporary anchorage in the northerly monsoon period in the mouth of the harbour, in about 10 fathoms, sand, abreast the large mangrove bush lying southward of Ras Matuso, at about 2 cables from the reef; the farther eastward the better, to be out of the rush of the tide.

Supplies.—There is said to be no running water on Kilwa island; the inhabitants are supplied from wells. Cattle, goats, and fowls are fairly plentiful, and the island abounds with bush buck.

Tides.—It is high water at Kilwa Kisiwani, full and change, at 3h. 45m.; springs rise 12 feet, neaps $7\frac{1}{2}$ feet.

Directions.—In making Kilwa Kisiwani from any direction, the Mpara hill, situated between Kilwa Kisiwani and Kilwa Kivinje, will be seen in clear weather from a distance of 20 miles. It is flat-topped and in no way remarkable, except being near Singino hill to the northward and the only eminence in the immediate vicinity. To the southward of Songa Manara island are other hills rather similar in appearance, but they are continuous, whereas south of Mpara is a low plain forming a break of 20 miles. In very clear weather the Machinga range, 1,200 feet above the sea, 20 miles inland, will also be seen, but the summits are not well marked. Ras Matuso is tolerably conspicuous either from northward or southward, as it projects considerably. Mwamba Rukyira is always to be seen from a distance of 3 miles off, either dry or breaking.

At low water, no other guide but the eye is necessary for entering the harbour, but at high water only the outermost parts break, and the Balozi spit does not show its existence by a ripple, rendering a leading mark necessary. A stranger should, if possible, avoid entering with the strength of the flood, with the sun ahead, as the tides run with great velocity. On the ebb, the rush of water sometimes raises a sea between the outermost points of the reefs, which at springs is dangerous for boats, and makes it difficult to realise that there is over 30 fathoms of water where the overfalls take place.

To enter, steer along the south-eastern edge of Rukyira reef at the distance of a few cables, when, except with the sun ahead, the old castle will be seen, dirty white and appearing like a white cliff in a mirage, closely backed by many trees of thick foliage which overtop it. When the castle is seen, steer for it on a W. $\frac{1}{2}$ S. bearing; from abreast the large mangrove bush on the edge of the reef, south of Ras Matuso, the southern extremity of the white sand in Mso bay should be clearly seen, with some yellow cliffs just to the left. When this extremity of the sand bears N.W. by W. $\frac{1}{2}$ W. steer for it, which

course will lead in mid-channel past Balozi spit, but care must be taken that the tide does not sweep the vessel off the line of bearing.

When Castle islet bears W. by S. (or is within its own width of Ras Rongozi), alter course to S.W. by W. $\frac{1}{2}$ W., with the observation spot boabab tree (which is not easy to identify from similar trees around it) right ahead ; when the low mangroves off Ras Kipakoni bear East* alter course for the anchorage, with Castle islet a little on the port bow.

These directions, reversed, will suffice for leaving the harbour. There is no difficulty in sailing out in the early morning with the land wind.

Caution.—The current runs continually to the northward off all this part of the coast, and frequently sets in towards the land. Vessels making the land should therefore steer to the southward of the desired point, and if closing at night heave to in ample time to allow for drift. The current is stronger and more regular during the southerly monsoon, when its strength increases at times to 4 miles an hour.

WINDS.—Easterly winds prevail here in the form of strong sea breezes during the greater portion of the year, and generally occasion a considerable swell outside the harbour, so that in working out in a sailing vessel, if the wind falls light, it is sometimes difficult to get out : this consideration gives more importance to the outer anchorage ground mentioned, which is the only position where a vessel can possibly anchor outside. The land wind blows early in the morning.

COAST.†—From Ras Matuso the coast trends northward for $7\frac{1}{2}$ miles to Ras Tikwiri, bordered by a reef which dries to the distance of a half to one mile, being a continuation of Mwamba Rukyira. The coast is sandy and flat with several villages, backed by thick jungle, behind which rises Mpara hill.

Ras Tikwiri (Kilwa point), is a mangrove point broken at its extremity into isolated clumps of these trees. The edge of the shore reef is 3 cables beyond the extremity of the mangroves.

From Ras Tikwiri the coast turns sharply south-westward, forming a deep bight, thence it trends in a north-west direction for about 5 miles to Ras Miramba, densely lined with mud and mangroves, and with sand banks drying some distance off.

* The bearings of these mangrove points must be used with caution, as they may be growing considerably farther out.

† See Admiralty chart :—Ras Tikwiri to Zanzibar channel, No. 662 ; and plan of channels between Ras Tikwiri (Kilwa point) and Mafia island, No. 1032. Scale, m = 0.5 of an inch.

Ruangale reef, dry 7 feet at low water springs, and separated by a boat channel from the shore reef, lies 2 miles eastward of Ras Tikwiri. The sea always breaks on its outer edge.

Rukyira bay, between Ras Matuso and Ras Tikwiri, has excellent anchorage at its southern end, where the Mwamba Rukyira protects a vessel from the swell. It is, however, of little use, except to small vessels, in consequence of Rukyira bar blocking the entrance from seaward.

Rukyira bar.—From Rukyira spit, the north extreme of Mwamba Rukyira (page 298), a narrow rocky bar, parallel, and about 5 miles distant from the coast, extends northward for 9 miles, with irregular soundings of from 5 to 2 fathoms, and in one or more spots less. Though there are doubtless places where vessels can at all times pass over it into Rukyira bay, yet it should not be attempted without good cause, as there is usually a very heavy swell, and from the irregularity of the bottom other shoal spots, besides those marked on the chart, may exist. This bar practically blocks the southern passage into Kilwa Kivinje.

Mpovi reef, $2\frac{1}{2}$ miles in length, with a sand head at its north-west extreme, is the southernmost of the mass of reefs protecting the anchorage of Kilwa Kivinje; its south-eastern end lies North 2 miles from the mangroves off Ras Tikwiri. There are a few mangrove bushes near the eastern edge of the reef, which is tolerably steep-to and dries 11 feet.

On all other sides the reef shoals gradually off, and though $1\frac{1}{2}$ miles from the shore, the channel within it is only available for vessels of 10 feet draught. Shallow water extends 2 miles northward of the sand head.

Mwanamkaya reef, forming the northern side of the south channel to Kilwa Kivinje, is $2\frac{1}{2}$ miles in length, and situated about 2 miles north-eastward of Mpovi reef, having a good passage with 8 fathoms water between; the south-western edge is not steep-to, but can be passed at the distance of a quarter of a mile. Near the north-west corner is a large sand head, which only covers at springs, with depths of 3 fathoms only at three-quarters of a mile distant. A patch of 4 fathoms lies about one mile eastward of the reef, one of several lying off the north end of Rukyira bar.

Fungu Amana, $1\frac{1}{2}$ miles in extent, lies about one mile northward of the shoal water extending from Mpovi reef, with Ras Miramba bearing S.W. by S. about 2 miles from its west extreme. It shoals off for 2 or 3 cables all round, but the sea nearly always breaks

on its north-eastern edge. The sand on its western end dries at half tide.

Ras Miramba is a low mangrove point, with shallow water extending 1½ miles to the northward, and 4 fathoms between it and Fungu Amana. Westward of Ras Miramba the coast forms a shallow bay as far as Gingwera river, a distance of 3 miles.

KILWA KIVINJE is situated one mile westward of Ras Miramba, partly enclosed with cocoa-nut trees; it is a straggling collection of huts and ruins, with a few stone houses and a small bazaar, and may contain about 3,000 inhabitants. Formerly, it was the principal port for the exportation of slaves, but its importance has much diminished since the stoppage of that traffic, though there might be a considerable legitimate trade were it properly fostered, and as the mail steam vessels occasionally call here, it is possible the trade may increase.

The Liwali or Arab governor of Kilwa Kivinje is supreme over all the coast and islands from cape Delgado to the north of the Rufiji, including Mafia island. He has a guard of soldiers, and there is a prison to confine offenders.

At the back of Kilwa Kivinje is Singino hill, a flat cultivated plateau rising to a height of 550 feet, and about 3 miles in diameter. Its rim or edge is tolerably steep on all sides, and may be used for bearings. To the westward, connected by a low spur, is a small conical hill, 480 feet in height, named Nunguruku. Other small hills stretch away to the westward, but the general prospect in that direction is flat and uninteresting.

Mto Gingwera enters the sea at 3 miles north-westward of Kilwa Kivinje, and its bar dries completely across at springs. The river can be ascended about 9 miles, and abounds in hippopotami.

On the north side of entrance stands a high casuarina tree, which shows somewhat above the surrounding bushes, from outside the reefs; the apparent gap in the coast which the river makes, is now, however, a better mark for the Main pass.

Supplies.—The town of Kilwa Kivinje is amply supplied with wells, but there is no convenience for watering a ship. Cattle, sheep, poultry, and eggs are abundant, but vegetables (beyond the staple native crops of millet, manioc, and sweet potatoes) are not so easily procured.

Anchorage.—The anchorage is open, though good protection is afforded by the reefs to the north-eastward in ordinary weather, but when the monsoon is strong, a little swell fetches through the

passages. The sand and mud bank off Ras Miramba and the town dries off about half a mile at low tide, and shallow water with patches of rock extends about $1\frac{1}{2}$ miles from the coast, at which distance it drops suddenly to 4 and 5 fathoms.

A vessel should therefore be careful in approaching this anchorage not to shoal the water to less than 5 fathoms. A good berth in about this depth, is with the centre of Kilwa Kivinje bearing S. by W. $\frac{1}{2}$ W., the Gingwera tree W.N.W., and Ras Miramba S. by E. $\frac{1}{2}$ E. In this position a vessel will be $1\frac{3}{4}$ miles from the town.

Tides.—It is high water at Kilwa Kivinje, full and change, at 4h. 0m.; springs rise 15 feet, neaps 9 feet, and neaps range 2 to 3 feet. There is but little tidal stream at the anchorage.

Reefs in the approach.—Mwanamkaya and Amana reefs, on the south side of the approach, are described on page 302.

Fungu Jewe, $3\frac{1}{2}$ miles in length east and west, and steep-to on all sides, lies 3 miles northward of Fungu Amana, with a deep and clear channel between, which is the main passage for vessels into Kilwa Kivinje. Along the south-east face it breaks heavily, and is at all times visible. At half tide a long expanse of sand uncovers, which has no particular head.

Luala reef, 2 miles in length north and south, and $1\frac{1}{4}$ miles in breadth, lies $1\frac{1}{2}$ miles eastward of the north-east extreme of Fungu Jewe, with a deep channel between. The sea breaks on its eastern edge, and the reef dries at half tide, but it is not so conspicuous as Fungu Jewe, as it shows less white sand.

Luala channel lies between Fungu Jewe, and Luala and Pweza reefs, and is useful to vessels coming southward that have taken the inner channel so far, but not bound to Kilwa Kivinje. The channel is $1\frac{1}{2}$ miles wide, deep and clear, and the reefs on either side can generally be seen.

Fanjove island.—This small island, situated about 5 miles northward of Kilwa main pass, is covered with tall trees, and stands on the inner part of a reef 6 miles in length, in a northerly direction, on the edge of the deep ocean water. The south end of this reef is 4 miles southward of the island. The outer edge of the reef is everywhere steep-to, and the sea always breaks on it; at low water it dries a few feet. At one mile W.S.W. of the south end are some patches of 3 fathoms, and steep-to.

KILWA MAIN PASS.—Directions.*—The main passage into

* Directions for approaching Kilwa, by Mafia and inner channels, see pages 327—329.

Kilwa Kivinje lies between Fanjove, Luala, and Jewe reefs on the north, and the Mwanamkaya and Amana on the south. This channel is 3 miles wide and clear of danger. No soundings will be obtained with the hand lead until midway between Jewe and Amana reefs.

In approaching Kilwa Kivinje from the eastward, Fanjove and the larger island of Songa Songa will be sighted on a clear day at a distance of 14 miles; and the Singino and Mpara hills under similar circumstances at 18 or 20 miles; both hills are flat, the Singino being the longer. To the southward of Mpara hills nothing will be visible except in very clear weather, when the distant Machinga hills may perhaps be seen.

Steer to pass from 4 to 5 miles southward of Fanjove until the breakers on the reef extending southward of it are seen, when the eye will be the guide; give them a berth of at least half a mile. If the weather be clear and the sun not ahead when Fanjove island bears N.N.E., Gingwera tree showing a little above the surrounding bushes, may perhaps be distinguished in the gap of the coast, or the gap itself will suffice for a mark, *see* view on chart. Bring the tree or centre of gap to bear W. $\frac{1}{2}$ S. and steer for it until the western end of Jewe reef bears North, when alter course to the south-westward for the anchorage off the town; the latter will be seen under the plateau of Singino.

Inside the outer reefs the water is discoloured.

COAST.—From Mto Gingwera, the coast trends in a northerly direction, with some slight sinuosities and points to Ras Samanga Fungu, a distance of 18 miles. For about 7 miles, or 2 miles beyond Mtompiani village, the shore is a sandy beach, but farther on it is fringed with mangroves. There are villages all along the coast, but mostly concealed by the mangroves. There are no reefs, except off Ras Wango, but a sand and mud flat dries off to a considerable distance.

The coast is backed by a flat plain, which to the northward gradually slopes upwards to a number of low wooded ridges, parallel to the coast, which again rise to the Matumbi range, 17 miles from the sea, averaging 2,000 feet in height. These mountains are the eastern termination of the high land that forms the southern watershed of the valley of the Rufiji.

OUTER ISLANDS AND REEFS.—Songa Songa island, situated about 10 miles eastward of Ras Wango, and 3½ miles north-westward of Fanjove island, is a coral island 2½ miles in length, covered with trees. It stands on a broad reef dry at spring tides, and surrounded

by extensive shallow water on all sides but the north-western, where Pumbavu a small sandy islet with a few scattered trees, is connected to the main island by a neck of sand half a mile long. At the distance of a quarter of a mile off this islet the water is deep and clear. On the point of Songa Songa nearest Pumbavu is a clump of cocoa-nuts, palms and casuarinas, conspicuous from northward and southward, when inside the reefs.

Songa Songa has a village near its eastern shore, and wells with tolerably good water in the coral nearly in its centre; these are difficult of access and best approached from its western side. Bullocks and goats are bred on the island.

Anchorage.—There is anchorage in from 5 to 6 fathoms, from 3 to 5 cables westward of Pumbavu islet. Small craft can anchor in 4 fathoms, nearer the west side of the island by passing over the flat, joining Pumbavu islet with the dry sand-head southward of it, in net less than 2 fathoms, at low water, with sheltered anchorage, abreast a small sandy beach.

Val rock, with 6 feet least water and steep-to, lies $2\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from Pumbavu islet, and one mile from Songa Songa island reef. As the rock does not show, it should be given a wide berth.

Pweza is a small reef lying $1\frac{1}{2}$ miles northward of Luala reef, with a small sand-head dry 8 feet at low water springs.

Fanjove flats.—Northward of Fanjove island, the outer line of reefs, with depths of about 3 fathoms, is continued from Fanjove reef for 4 miles along the edge of the deep water to Fungu Imbi. The tiderushes over this flat, and in strong winds the sea breaks on its edge.

Fungu Imbi is $2\frac{1}{2}$ miles in length, with a sand-head dry 7 feet at low water springs; it is steep-to along its outer edge, and the sea breaks heavily.

Nyuni is a small coral and sand island with bushes, and two or three taller casuarinas on its eastern side, which can be seen from a distance of 12 miles. The outline of Nyuni from a distance is flat, with the casuarina trees appearing above the general level.

The island bears N. by E. 11 miles from Fanjove island, and lies on the western side of a reef, 3 miles in length, dry at low water, and steep-to on its seaward side. Turtle frequent this island and Okuza north of it, from February to July.

Nyuni pass.—Between Fungu Imbi and Nyuni island, deep water extends in to the westward towards a narrow 6-fathom channel through the reefs southward of Nyuni, but as no good leading mark

can be given, and the swell being heavy on the edge of the shoal water, the passage is not recommended.

Fungu Mombawaka is $1\frac{1}{2}$ miles in extent at its seaward edge, having a small area awash at low water, the remainder having a few feet depth always over it, and the sea generally breaks. It lies northward of Nyuni reef, being separated by a 5-fathom channel, a quarter of a mile wide.

Okuza island, 6 miles northward of Nyuni island, is small, sandy, and covered with casuarinas, the highest of which are at the eastern end, and can be seen 14 miles in clear weather. The island is on the north-west part of a reef, $3\frac{1}{4}$ miles in length at its seaward face; it is all dry at low water springs, steep-to on its seaward side and tolerably so on the other sides.

Northward of Okuza is a break in the chain of reefs for 8 miles to the reefs of Kibondo island, leaving a clear deep passage into Mafia channel.

Anchorage.—There is anchorage within Okuza reef, in from 8 to 15 fathoms, but in the north-east monsoon a berth well to the south-west should be chosen to avoid the swell.

INNER REEFS AND CHANNELS.—Between the outer reefs and islands before mentioned, and the main land southward of the Rufiji, is an inner chain of reefs, which for the most part have navigable channels between them. There are, however, two main routes that will generally be useful to vessels when the sun is in a favourable position, and if a good look-out aloft be kept. The reefs bordering these will be described, commencing from the southward.

Pwajuu reef is $1\frac{1}{2}$ miles in length, and lies south-westward, distant $3\frac{1}{2}$ miles from Pumbavu islet, and W. by N., $2\frac{1}{4}$ miles from Val rock, with a deep channel between. A long extent of sand on the reef dries at half tide. The eastern side of the reef is steep-to, and can generally be seen.

Poiasi reef, three-quarters of a mile northward of Pwajuu, is $2\frac{1}{2}$ miles in length, and half a mile in breadth. The sand on it dries over an extent of $1\frac{1}{2}$ miles, the highest part being towards the north, where it dries 11 feet at springs. The eastern edge of the reef is steep-to.

Here the eastern and western channels divide; the reefs bordering the eastern channel are Baniani, Sanders, Mzuaji, Kimbore, and Barawa.

Fungu Baniani, 3 miles northward of Pumbavu islet, has a

sand-head which dries 10 feet. Its eastern edge is not very abrupt and should be given a berth of half a mile.

Sanders rock, with 7 feet least water, lies $1\frac{1}{4}$ miles S. by E. of Fungu Baniani ; this danger cannot be seen.

The left fall of Singino hill on with the left extreme of Pumbavu islet, S.S.W., leads in 4 fathoms, between Fungu Baniani and Sanders rock.

Mzuaji reef lies 3 miles N.E. $\frac{1}{2}$ E. from Pumbavu islet ; it has no sand on it, and dries 2 feet at low water springs.

Kimbore is a small reef one mile west of Newni island, with a sand-head and a large rock, both of which dry 7 feet. At high water, Kimbore is not easily seen ; its western edge is tolerably steep, but off its eastern side shallow water extends half way to Newni island.

Bawara is the general name of a number of reefs which lie north-westward of Newni island, the nearest being $2\frac{1}{2}$ miles distant, with a 4-fathom channel $1\frac{1}{4}$ miles wide between it and Kimbore reef. These reefs cover an area of $2\frac{1}{2}$ miles north and south, and 3 miles east and west, and show four sand-heads when dry. The eastern reef is not steep, and a vessel taking this route should give preference to the Kimbore side. The reefs on the west side can be passed tolerably close, but there is no necessity to do so.

A small coral bank with 3 fathoms water on it lies $2\frac{1}{2}$ miles S.W. $\frac{1}{2}$ S. of Okuza island. Northward of this bank the passage is clear.

The reefs bordering the western channel are the Machangi, Chocha, Membeuso, Banda, and Simaya islands.

Machangi is the name of a collection of reefs lying from 5 to 7 miles northward of Songa Songa. The south-western reef dries at half tide ; its edge is steep, but does not show well.

The north-western reef has a sand-head which is only covered at high water, and except at that time is an excellent guide for the channel. It is near the western edge of the reef, which is fairly steep-to on that side.

Chocha is 2 miles in length, uncovered at low water, with sand on its north-west extremity, which dries 9 feet. The south-east end tails off for 2 cables, but it can generally be seen showing green under water. The eastern point of Chocha is West $1\frac{1}{4}$ miles from the sand-head on Machangi.

Membeuso lies $2\frac{3}{4}$ miles north of Machangi, and is smaller; the sand on it dries 8 feet, and its eastern edge is quite steep. Simaya island, bearing N. by E., leads eastward of this reef.

Banda is a small reef with a sand-head which dries 8 feet at low water springs. It lies north-eastward $2\frac{1}{4}$ miles from Machangi sand, and its western side is not steep-to.

Simaya island, of sand, is covered with high trees, and visible at a distance of 14 miles. The island is surrounded by a reef, three-quarters of a mile in length, which is steep-to.

COAST.—Ras Samanga Fungu, situated 18 miles northward of Gingwera river, is a point of high mangroves conspicuous from the northward when in shore. Immediately north of it is Samanga Fungu creek with a small village of the same name.

Samanga Ndumbo is the name of a large village and creek, $1\frac{1}{4}$ miles north of Ras Samanga Fungu. It is the largest village between Kilwa Kivinje and the Rufiji, and is quite concealed from the sea; there are Banians here. The estuary contracts at a short distance from the sea, and is said to join another creek which debouches at one mile to the north-eastward.

Ras Ndumbo is a mangrove point with a large detached bush off it.

Mohoro bay is the deep indentation with shallow water between Ras Ndumbo and Ras Pombwe. It is lined with a thick belt of mangroves, and a large portion dries at low water.

Kitope hill is a conspicuous flat-topped hill, 780 feet high, rising in the plain 5 miles from the head of Mohoro bay. It is thickly wooded, and has a lower spur to the northward with a small conical-shaped summit.

RUFIJI DELTA.—In Mohoro bay commences the remarkable maze of creeks which form the delta of the Rufiji and Mohoro. Some of these creeks do not communicate at ordinary times with either river, neither do the rivers themselves ever join, though at one point in their courses they approach one another closely; but in the rainy season of the interior, December and the two following months, the whole plain is frequently flooded, when the water doubtless escapes by either river indifferently, and all the large mouths that open to the sea assist to carry off the surplus.

The delta has been pushed forward in advance of the general line of the land, and now forms a convex projection with a coast line 50 miles in length, which is all low and of a uniform outline as

viewed from the sea. Mangroves occupy the greatest portion of the shore line, and extend back for a varying distance from it. Inside the swampy belt is a broad flat plain, covered with long grass and a few trees, and dotted here and there with small villages, in the vicinity of which and near the rivers is cultivation. This plain is 35 miles north and south between the boundary lines of Matumbi and Mtoti hills.

In Mohoro bay, westward of Ras Pombwe, are the two mouths of the Mohoro, and a large salt water creek. From Ras Pombwe, the general direction of the coast is north-north-east for 30 miles to Ras Twana ; here the coast turns sharply to the north-west for 11 miles to the village of Kikunguni, standing on the northern shore of the entrance of the Kikunya. On this extent of 41 miles of coast, ten large mouths open into the sea, eight of which are connected at all times with the Rufiji, the other two being only salt water creeks. All these mouths are connected by a series of small creeks, through the mangroves near the sea, that serve at high water as passages for canoes from one village to another without the necessity of crossing the bars.

The Rufiji river is described on page 313.

Best Entrances.—If going to ascend the Lufiji, the Simba Uranga and the Kikunya (p. 312, 313), are the best months to choose, on account of the absence of bars. No dhows go above the delta.

Kikwaju, a broad but shoal water creek, lies at the north-west corner of Mohoro bay. On the western shore, a short distance up, is the village of Marendego.

Between the Kikwaju and Ras Pombwe are the two mouths of the Mohoro.

Utagite and Lokotonasi are huge mangrove lined creeks, with from 2 to 3 fathoms at low water springs, which join together 3 miles to the northward where the Mohoro proper begins. The Utagite has a depth of 3 feet at low water springs on its bar, which is 2 miles outside the entrance. There is no swell on the bar, and the channel is straight. The west bank of the river kept N. by W & W. will lead a boat through it. The sea breaks on the sand banks on either side at half-tide with any wind.

Mohoro river is 200 yards wide where it joins the Utagite, and at the highest point reached by the *Fawn's* boats, 14 miles in a direct line from the coast, was 80 yards in breadth, but had at that distance become so shallow that the steam cutter could get no farther ; here

were numerous villages and cultivation. The banks of the river were from 10 to 20 feet in height, and where not scoured into cliffs by the current, densely covered with vegetation. The tidal influence extends above this point.

The Mohoro is probably fed from the Matumbi hills, which extend far to the westward. The land route from Kilwa to Dar-es-Salaam passes through these villages. Coasting craft ascend the river for trade.

Ras Pombwe, the eastern point of Mohoro bay, is of mangrove.

Fungu Okambara is a coral and mud reef that stretches off for $3\frac{1}{2}$ miles in a south-east direction, and dries 8 feet.

Northward of Okambara, is Mwamba Mkuu, another large reef, which also dries 8 feet. There is a bight with 8 fathoms water, between the two.

Pombwe creek is a lake like estuary, with a mouth half a mile wide, extending in a north-west direction from Ras Pombwe for $2\frac{1}{2}$ miles, when it ends in mangrove swamps. Bachambao is the name given to the southern branch of it, and Ras Pombwe is also known by some as Bachambao.

Yaya mouth, 4 miles northward of Ras Pombwe, is the southern-most creek having a connection with the Rufiji. There are several ramifications of it unexplored which probably lead north and south into the adjacent mouths. The river is called the Kiegieni or Rufiji-ya-wake and meets the Rufiji at a point N.N.W. 12 miles from this mouth. The upper part of this branch is too shallow to allow a boat to reach the Rufiji in the dry season.*

The Yaya is $1\frac{1}{2}$ miles wide at the entrance, and the bar which is $1\frac{1}{2}$ miles outside never entirely dries, but there is usually a nasty swell on it. Several patches, awash at low water, and 6 to 7 fathoms close-to, lie from 2 to 4 miles off the entrance. Yaya village is on its north bank at the entrance, and one mile to the northward is a double-headed clump of tall trees.

Bumbura, the next creek, to the northward, was not explored, as the bar could not be crossed. It is reported as only a blind creek, connecting by narrow passages the branches north and south of it.

Ndahi mouth is $7\frac{1}{2}$ miles north-eastward of the Yaya, and may be distinguished by a thick and high grove of casuarinas on its northern bank. The sea rolling in through the break in the outer reefs south

* See also Admiralty plan :—Mafia island and channels, No. 458 ; scale, $m = 0.5$ of an inch.

of Kibondo, makes the bar bad at all times. At a distance of $2\frac{1}{2}$ miles within the mouth, it joins the Kiassi.

Kiassi mouth, $5\frac{1}{2}$ miles north-eastward of the Ndahi, is a broad arm, joining the latter at 5 miles to the south-westward.

Above the fork it takes the name of Kimero, and runs through open grassy country. At 3 miles farther westward is the junction of the Usenbe, which leaves the Rufiji 3 miles below the Kimero. Neither of these rivers afford a passage for a small steam launch in the dry season, unless perhaps at spring tides.

The Kimero leaves the main river at a point $10\frac{1}{2}$ miles in a straight line from the Kiassi mouth, and has a course of 17 miles.

Msala mouth may be looked upon as the true mouth of the Rufiji, although one of the smallest; but fresh water and terra firma are much sooner reached than in the larger mangrove entrances. It opens abreast Boydu island, from which it bears N.W. by W. $\frac{1}{2}$ W. distant $5\frac{1}{2}$ miles. Sand and mud banks dry off the Msala for 3 miles, and at low-water springs entrance is impossible; there is a considerable swell on the bar when the wind is fresh. The deepest water will be found rather to the northward of a line joining Boydu island and the entrance.

Immediately inside is a large creek trending to the southward, and where is situate the village of Msala. At 5 miles up the main branch, at a distance of 3 miles in a direct line from the sea, the mangrove belt is passed; for 7 farther it is bordered by dense forest, in which are rice clearings, and then at the point where it branches, and where the Rufiji proper is reached, it emerges into open country. A few miles from the sea, it takes the name of Bumba; its average breadth is from 80 to 150 yards, with a depth of 2 fathoms.

Ras Twana, the eastern point of the delta of low mangroves, is $8\frac{1}{2}$ miles north-north-westward from Boydu island, and 6 miles north-east of Msala mouth. The sand and mud bank stretches off for $3\frac{1}{2}$ miles, and is tolerably steep-to, but not visible unless when the sea is breaking.

Twana creek lies immediately to the westward, but it is only a blind creek.

Kiomboni mouth is 2 miles north-west from Ras Twana, and is one of the large mouths of the Rufiji. The river runs through dense mangroves, with a width of 400 yards, and a depth of from a half to 3 fathoms, for 12 miles, before it joins the Simba Uranga.

Simba Uranga is the branch of the Rufiji best known to the

coast traders, who resort there to load with timber for house rafters for Zanzibar. It has no bar, but the water is shallow for more than 5 miles from the land, and at low water there is sometimes a considerable sea, raised by the ebbing tide. There are some mud banks just awash at low water springs, lying 3 miles from the entrance ; these must be kept on the port hand when entering the river.

Steering S.W. $\frac{1}{2}$ S. for the centre of the entrance a boat will carry 8 feet water in, at the lowest tides.* Inside, the water deepens to as much as 10 fathoms, but only for a short distance. Above, the estuary is 300 to 400 yards wide, and carries a depth of from one to 3 fathoms, to its junction with the Kiomboni 10 miles to the south-westward. Several creeks to the northward communicate with the Kikunya branch.

Immediately inside the entrance, the large ramifications of Suninga, branches to the southward and rejoins again $8\frac{1}{2}$ miles to the south-west. There are several villages in the creek, Suninga being the largest. The courses of both the Simba Uranga and Suninga lie entirely through mangrove swamps. If going to ascend the Rufiji, the Simba Uranga or the Kikunya are the best mouths to choose on account of the absence of bars.

Kikunya mouth is the northernmost and largest of these great openings. It is 3 miles north-westward of Simba Uranga, and $2\frac{1}{2}$ miles wide at the entrance. There is no bar, and a depth of 2 fathoms at low water springs can be carried in steering S.W. $\frac{1}{2}$ W., for the centre of the entrance. Kikunya village stands on firm land near the head of a little branch creek, 9 miles from the coast, and is the most important in the neighbourhood.

The passage of the river presents no difficulties until within 2 miles of Kikunya ; here the river becomes narrow, with sharp bends, with only about 3 feet at half tide. At the landing place, one mile below the village, there is a deep pool with from 4 to 6 fathoms water, where the dhows receive their cargoes.†

The Kikunya is only connected with the Rufiji by side communications to the Simba Uranga, and has no fresh water in it. In all the branches northward of Msala, the water is salt, as the amount of fresh water which finds its way into them is so small compared with their vast area, that it produces no effect.

RUFIDI RIVER, indifferently called Lufiji, is most disappointing above the delta. The number and size of its mouths, and the

* It is probable that this varies from year to year.

† Remark Book :—Lieutenant C. Robertson, H.M.S. *Kingfisher*, 1885.

undoubted distance of its source, leads the traveller to expect a much larger stream than he will find. When the inundation caused by the interior rains has subsided, and the current of the river somewhat reduced, so as to allow a boat to ascend, the water channel is limited and obstructed by many shoals and banks, and whenever the river widens with a straight reach it is frequently all more or less shallow.

With the exception of these hindrances, the steam cutter of the *Fawn*, drawing 3 feet, made her way without difficulty for 30 miles to Kisoma, which is 20 miles in a straight line from the Msala mouth, and carried from 9 to 10 feet water all the way, except at one spot rather above Ukema village, where there seemed to be no deep channel but a bar with 2 to 3 feet across the river, which would probably be altered by the next inundation. The ordinary depth in the channel was from 2 to 3 fathoms.

At Mpembeno, the river was over 300 yards wide from bank to bank, but the water channel was not over 80 yards. The deep channel was not wide, and in all probability nothing larger than steam launches will ever navigate the Rufiji. Natives at Kisoma reported that higher up, the river was more encumbered with banks, but as they did not profess to navigate it, too much confidence cannot be placed in their report. The tide reaches to near the fork of the Kimero ; above this, the current was on an average $1\frac{1}{2}$ miles an hour. The country is perfectly flat and uninteresting, having very few trees. The villages are small and few in number.

At Mpembeno, is the main ferry by which the land route from Kilwa to Dar-es-Salaam crosses the Rufiji. The villages here are rather larger than usual. Grain, roots, and pumpkins grow well here. No dhows go above the delta. The Rufiji tribes owe no allegiance to Zanzibar, and each village is independent.

MAFIA ISLAND.*—General remarks.—Mafia is the third in point of size and importance of the large islands under the authority of the Sultan of Zanzibar. The island, composed of coral, is 27 miles in length in a north-east and south-west direction, with an extreme breadth of 9 miles. The coast of the island generally is low, but it has a central rocky plateau of about 100 feet in height, the trees on it making a total elevation of 200 feet ; its outline is devoid of any feature.

* See Admiralty charts :—Kilwa point to Zanzibar channel, No. 662 ; and plan of Mafia island and channels, No. 458 ; scale $m = 0\cdot5$ of an inch.

The outer or eastern side is all cliffy, and fringed by a narrow coral reef, which is steep-to, and on which the sea breaks furiously. The south and inner coasts are bordered with reefs of varying widths, and have many shoals off them.

The island is much cut up by mangrove swamps and creeks, but a large part is fertile, and cultivated with cocoa-nut trees, manioc, &c.

The most considerable village is on the island of Chole, on the south-east side of Mafia, at the entrance to the bay of the same name. From the fact of the main trade being carried on here, there seems to be a general inclination of the natives to call the whole island of Mafia by the name of Chole, which leads to some confusion. The other villages, though numerous, are all very small.

Mafia is opposite to the delta of the Rufiji, from which it is separated by a channel 9 miles wide. This channel, though much encumbered by reefs, is nevertheless perfectly navigable by day, and may be of great assistance to a vessel with small steam power on her way south against the south-west monsoon.

SOUTH COAST.—Tutia reef is a detached reef, at the extremity of a reef extending $5\frac{1}{2}$ miles south-westward from Kibondo island, and is the southern danger of Mafia. A sandbank on the north-western part of Tutia reef dries 12 feet at springs, and the outer edge of the reef breaks heavily, always showing its position; a rocky ridge on this edge is as high as the sand cay, but being black is not conspicuous. Tutia is separated by a 4-fathom channel from Kibondo reef, but the passage is too narrow to navigate.

Caution.—It must be borne in mind that the sandbank is on the inner side of Tutia reef, and a good berth should be given in rounding it from seaward, as the current sweeps rapidly up towards it. There are depths of 10 to 12 fathoms water, nearly one mile southward of Tutia reef.

Kibondo island is a flat coral island $1\frac{1}{4}$ miles in length, lying $3\frac{1}{4}$ miles from the south coast of Mafia. There is a village on the island, but no water or supplies. A clump of tall trees on the southern end are conspicuous, and some palms on the north-west point also show well.

A broad reef that dries several feet at springs, with several islets on it, extends $4\frac{1}{2}$ miles south-westward from Kibondo island; its outer edge is steep-to and the sea breaks heavily.

Anchorage.—There is capital anchorage sheltered from all swell within Kibondo reef. A good berth is in 6 fathoms, sand and

mud, with the southern islet of Kibondo E. $\frac{3}{4}$ S., and Tutia sand S. by W.

Juani island lies northward of Kibondo, on the same reef, and forms the southern shore of Chole bay. It presents seaward a straight face of cliffs 10 feet high, $4\frac{1}{2}$ miles in length, and which are fringed by a narrow reef. Its inner coast is cliff and mangrove. The channel between Kibondo and Juani is $1\frac{1}{2}$ miles wide, and quite dry at low water.

Chole island is one mile in length, and lies north-westward of Juani on the same reef. Chole is the principal place for trade in Mafia ; it contains about 2,000 inhabitants, and is locally celebrated for its mats. The Arab governor, who is under the authority of the Liwali of Kilwa, resides here, and also numerous Banians and Hindis. It is a difficult place to communicate with, as a vessel cannot get nearer than the anchorage inside Kibondo, 8 miles distant, and the water is so shallow between the anchorage and Chole, that at low water springs, it is not easy even for a light boat to find the passage. Supplies of fresh provisions are scarce.

Chole bay is $4\frac{1}{2}$ miles in diameter, formed by a deep bay in the south-east shore of Mafia island, and nearly blocked to seaward by the islands of Juani, Chole, and Miewi. There is deep water in a limited area, but Kinasi pass, the entrance from seaward, is so choked with rocks, and the tide runs with such extreme velocity through it, that unless well buoyed it would be unsafe for a vessel to use.

The channel from the south-westward is also only fit for boats, though a vessel of 10 feet draught could, if necessary, pass in at high water springs, with but little risk, as the water is smooth. The shores of Chole bay are well cultivated and populated.

Tides.—It is high water, full and change, in Chole bay, at 4h. ; springs rise 15 feet, neaps 10 feet.

Coast.—Okuto reef.—From the south entrance to Chole bay, the south coast of Mafia trends westward in a gentle curve for $8\frac{1}{2}$ miles to the red cliffs of Dongo Jekundu, which are 60 feet high, and conspicuous. It is all low, mostly fringed with mangroves, backed by groves of cocoa-nut trees, and bordered by Okuto reef, and other shallow water, extending $3\frac{3}{4}$ miles to the southward, partly blocking the extensive bay formed by Kibondo reef. From the red cliffs the coast turns north-westward for $2\frac{3}{4}$ miles to Ras Kisimani.

Mange reef, situated south-westward of Okuto reef, and on the east side of Mafia channel, is 2 miles in length, uncovers considerably

at springs, and a sandhead on its northern extremity dries 12 feet. From the centre of this sandhead Ras Kisimani bears N. $\frac{1}{2}$ E. distant 6 $\frac{1}{2}$ miles. A vessel can pass on either side of the reef, but the western is the better channel. Mange reef can always be made out even when the sand is covered. At low water springs, it will be sighted 6 miles distant.

Ras Kisimani, the east point of entrance to Mafia channel from the southward, is the western point of Mafia island, and situated in lat. 7° 56' 42" S., long. 39° 35' 32" E.; it is low, sandy, and steep-to, with a large swamp at the back. A reef, which dries 5 feet at springs, begins immediately southward of the point, and can always be distinguished. Tolerably good water is obtained for the dhows, by digging holes in the sand on the northern side of the point, but it is difficult to obtain any other supplies, though there is a small village.

Boydu island lies opposite Ras Kisimani, and in the centre of Mafia channel. It is a narrow sandy island, 1 $\frac{1}{2}$ miles in length east and west, and covered with tall casuarinas. Its eastern point is 3 $\frac{1}{2}$ miles from Ras Kisimani, and its western 4 $\frac{3}{4}$ miles from the mainland. Boydu island lies on a large reef, which dries for a considerable distance round it.

MAFIA CHANNEL,* between Ras Kisimani and the mouths of the Rufiji, is about 9 miles wide, with Boydu island situated nearly midway. Around Boydu island are many small reefs and shallow patches, blocking the centre of Mafia channel for navigation, but leaving a passage on either shore, where vessels can pass. The water off and to the northward of the Rufiji delta is, however, so thick, that the navigator cannot always depend upon seeing sunken dangers.

The channel west of Boydu is marred by a shoal at its southern end abreast the Kiassi mouth of the Rufiji, with a least depth of one fathom, and which is difficult to be seen; other shoals lie between this shoal and Boydu island, and the channel being besides somewhat tortuous, will not be further referred to.

The channel east of Boydu, between Kauri and Mange reefs, and thence close by Ras Kisimani, is however straight, with a minimum breadth of half a mile, and depth of 5 fathoms. As before mentioned, it may be safely used in the daytime by vessels of moderate draught; the best time to navigate it is at low water, when the reefs are more easily seen; the current sets fairly through this channel as far northward as Sefo reef; *see* tides page 319.

Reefs.—Marima, 3 miles in length, which dries 4 feet, and

* For Directions, *see* p. 327.

Fungu Kauri, which dries 6 feet, lie on the west side of the main channel, southward of Boydu. Mange reef, 2 miles eastward of Kauri, has been described on page 316.

Belami, the next northward of Kauri, lies with its northern part bearing S.W. by W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles from Ras Kisimani. This portion is awash at low water springs, but there is a one-fathom tail that projects $1\frac{1}{2}$ miles to the southward, which is not easily seen, and forms with Kauri reef the western side of the passage.

The left extreme of Ras Kisimani bearing N. by E. $\frac{1}{4}$ E., or Mange sand S. $\frac{1}{2}$ W., will lead eastward of Belami reef. When the red cliffs bear East the reef is abeam.

Maduvi sand-bank dries 13 feet, and is generally visible. It lies on a reef 2 miles north-eastward of Boydu island, with Ras Kisimani bearing S.E., distant $2\frac{1}{2}$ miles.. A bank with 2 to 3 fathoms water, stretches N. by E. $3\frac{1}{2}$ miles from Maduvi, and forms the western side of the passage northward of Ras Kisimani. This bank is steep-to, and generally shows by a line of discoloured water.

Al Hadjiri reef lies 3 miles North of Ras Kisimani ; the sandhead on it dries 6 feet at springs, and is generally visible by the discolouration of the water. The western edge of this reef is not steep-to, and should be given a berth of about 3 cables ; Sefo reef kept N. $\frac{3}{4}$ E. leads about that distance clear of it. The breadth of the channel between it and the 3-fathom edge of Maduvi bank is 6 cables. There is a wider passage to the eastward of Al Hadjiri, but as it does not give a straight course, the other is preferable.

Sefo reef, 3 miles North of Al Hadjiri, has a sandhead on its western edge, which dries 12 feet at low water springs, and can always be made out. The breadth of the channel between Sefo and the 3-fathom bank of Maduvi, is half a mile. There is a clear passage $1\frac{3}{4}$ miles wide between Sefo, and Al Hadjiri and Salim banks (page 328), that can be used if preferred, and at low water, when all edges of the banks can be seen, it is the best route ; but at high water the passage west of Sefo is preferable, as the sandhead is on that end of the reef, and the course is direct. Shungu Mbili, and other islets and reefs bordering the channel are continued on page 322.

Caution.—From a point half a mile west of Sefo sandhead, a course South will lead straight through the channel to Mange reef, clear of all dangers ; but as there is no leading mark, frequent bearings of the points, &c. should be taken, to ensure that the tide is not sweeping the vessel out of the line, and that she is making good her course.

Tides and Currents.—It is high water at Ras Kisimani and throughout Mafia channel, full and change, at 3h. 55m. ; springs rise 15 feet, neaps 8 feet, neaps range 3 and sometimes only 2 feet. The direction of the tidal current northward of Ras Kisimani is ebb to the northward and eastward, and flood to the southward. Southward of Ras Kisimani they are nearly reversed, the ebb runs south-east and flood north-west. Those tidal streams, however, are frequently overpowered by the permanent northerly current, especially during neaps, when little or no alteration in the current will be found. This depends much on the wind, and if that be strong from the S.E., unless at spring tides, it is nearly certain that a strong northerly current will be found in Mafia channel, at any time of the tide. From Sefo reef to Mange reef the current is generally in the line of the passage, but a set north-eastward may be experienced on passing Al Hadjiri reef, when the ebb tide is strong.

DIRECTIONS, *see page 327.*

MAFIA WEST COAST.—From Ras Kisimani, the coast of Mafia island trends north-eastward to Ras Mbisi, distant 10 miles, forming Tirene bay. Tirene is a plantation 7 miles from Kisimani, where, under a hill covered with cocoa-nut trees, is a large white house showing conspicuously when the sun is shining on it.

The land at the back of Tirene is about 100 feet high, and has two natural objects that will be found useful in ascertaining a vessel's position. One is Palm hill, covered with cocoa-nut trees, which form a conical summit 170 feet high ; it is easiest to identify at a distance, as its conical shape is then more marked.

The other is Ngombeni, a clump of large mangoe trees, 175 feet above high water, at 3 miles eastward of Ras Kisimani, which show conspicuously against the sky ; there are a few other, but lower clumps.

Banks.—Northward of Ras Kisimani, the sand dries off at springs for $1\frac{1}{2}$ miles in a north-east direction ; the low water line then closes the coast, and at Tirene is half a mile distant, again increasing near Ras Mbisi to $1\frac{1}{2}$ miles. From Ras Kisimani the edge of the 3-fathom bank trends north-east for 5 miles, where, at a point from which Tirene house bears E. by S. $\frac{1}{2}$ S., the bank turns suddenly to the southward, forming a horn with deep water eastward of it.

Salim bank, composed of sand and coral, with one fathom least water, nearly joins the shore bank at the point of the horn above mentioned. It is 3 miles in length, $1\frac{1}{2}$ miles in breadth,

and its northern end is $1\frac{1}{4}$ miles from the eastern edge of Sefo reef. There is a channel between this bank and that fronting Mafia island, but no marks can be given for it, and the dangers do not show.

Tirene reef, awash at low water springs, lies with Tirene house, bearing S.E. by E., distant 2 miles. It is steep-to on its southern side, but shallow water extends two-thirds of a mile to the northward, and about one-third of a mile westward. It partly blocks the passage between Salim bank and the shore bank, and is not always seen.

Tirene Anchorage.—There is good anchorage off Tirene, in 6 fathoms with the house bearing E.S.E., distant $1\frac{1}{4}$ miles, and Ras Mbisi N.E. $\frac{1}{4}$ E.; here shelter is afforded by the banks. This berth is within Tirene reef, to pass eastward of which Palm hill should be kept S. $\frac{3}{4}$ E. This bearing leads to the anchorage, and also westward of a coral reef, awash at low water springs, 4 miles N. by E. of Tirene reef.

Ras Mbisi is a coral point backed by trees. To the southward is the entrance to a large mangrove creek. Lechmere hill is an elevation 160 feet high, behind Ras Mbisi.

From Ras Mbisi the sandy coast trends eastward for $6\frac{1}{2}$ miles to Kirongwe, another large mangrove creek, where is a village of the same name.

Ras Murundo is the north point of the entrance to Kirongwe bay, and is of sand, with high trees on it.

Off Ras Murundo, a coral reef named Mwamba Mkuu, stretches $2\frac{1}{2}$ miles north-westward, where its extreme dries 8 feet at springs.

From Ras Murundo the coast takes a north-east direction for $11\frac{1}{2}$ miles to Moresby point. It is chiefly sand with points of low coral cliff here and there, and some mangrove creeks; one of the latter, $4\frac{1}{2}$ miles from Ras Murundo, joins Kirongwe creek and has usually hippopotami in it.

Ras Mkumbi (Moresby point), the north extreme of Mafia island, is a coral cliff 15 feet high. Small bushes and trees cover the land behind, which is not above 80 feet high. Reefs extend 7 cables northward of the point, on which the sea breaks in ordinary weather.

A tail of broken ground stretches 5 miles northward from Ras Mkumbi, and patches of 9 fathoms are situated about 5 or 6 miles north-west of this tail near the edge of deep water. In the *Fawn*, no

less depth than 9 fathoms was found here, but it will be well to avoid their northern extreme, where the shallowest water is. The rush of the current, even in places where there is not less than 20 fathoms, is plainly seen, and makes it appear like a danger.

From Moresby point, the eastern coast of Mafia to Chole bay, a distance of 18 miles, is nearly straight, and bordered by a narrow reef which is steep-to.

N.W. Anchorage.—There is good anchorage off the north-west side of Mafia, south-westward of Ras Mkumbi, in from 8 to 14 fathoms. sand and mud, at from $1\frac{1}{2}$ to 3 miles from the shore; but only during the south-west monsoon, and not even then when the breeze is strong. A vessel, unless at anchor well in shore, may find a considerable swell rolling round Ras Mkumbi (Moresby). The edge of the reef which borders the shore, varies its distance at this part, from a few hundred yards to one mile, and can be clearly seen at low water, but is not steep-to.

There is a violent rush of water at spring tides through the channels round Barakuni island, but unless within a mile or so of the island it will not be much felt by a vessel at anchor to the eastward. A good berth is in 9 fathoms, sand and mud, with Moresby point N.E. by E. $\frac{3}{4}$ E., and Ras Bueni S.E. by E. This is a convenient position for communicating with the shore. The best landing at low water or half-tide, is at Ras Bueni, where there is but little reef.

Supplies.—There are several villages south-west of Ras Mkumbi and at Bueni $2\frac{1}{2}$ miles from it, bullocks, goats, fowls and a small quantity of yams and pumpkins may be obtained. Guinea fowls are plentiful.

Barakuni island, is a small sandy island, covered with casuarina trees, the tops of which are about 100 feet above high water, situated off the north-west side of Mafia, at about 10 miles south-westward of Ras Mkumbi; it lies on the south-west edge of a reef, one mile in diameter. A shallow spit extends 2 miles south-westward from Barakuni, leaving a narrow but deep channel between it and the edge of Mwamba Mkuu. This channel is not recommended as the edge of the Barakuni shoal, which has from one to 3 fathoms water on it, does not show well, and the velocity of the tidal stream is great, and in places sets across the channel.

Northward of Barakuni island are a collection of sunken reefs some breaking heavily whilst others do not show, with narrow

channels between, stretching up to Niororo island, and practically barring the passage between these islands.

Shungu Mbili island is similar to Barakuni, and lies 4 miles north-westward of that island; its highest trees, 100 feet, on the western end, show as a flat-topped mass, and may be seen in clear weather from a distance of 14 miles. The island lies on the southern edge of a reef $1\frac{1}{2}$ miles in length, which dries 3 feet at springs. Shallow water extends to the westward or channel side for $1\frac{1}{2}$ miles, where from the depth of 2 fathoms it suddenly increases to 7 fathoms. There are quantities of pigeons on this island and at Barakuni.

Southward of Shungu Mbili are several small patches of sunken reef, some of which are awash at low water; vessels should pass westward of all these.

Wumi reef, on the west side of Mafia channel, dries 2 feet at springs, but it is not easily distinguished at high water, as there is no sand on it. It lies W. by S. $\frac{1}{2}$ S., distant $5\frac{1}{2}$ miles from Shungu Mbili island. A patch of 2 fathoms water lies West one mile from Wumi reef.

Fili reef lies also on the west side of the channel, 3 miles north-west of Shungu Mbili island. It dries one foot at springs, and is of the same character as Wumi, but smaller.

Niororo island is about half a mile in length, and partly bordered by low coral cliff. It is covered with bushes, and in 1877 had one conspicuous casuarina on it, topping all other trees on the island, and 100 feet high. It is a great resort of turtle in the season, January to June, when natives come from the mainland to turn them. The island lies 5 miles northward of Shungu Mbili, and on the western edge of a reef, which dries; one of a number joined by shallow water stretching north, south, and east, from one to $3\frac{1}{2}$ miles, but not much to the westward. The northern spur of the reef is barely awash at low water, but the sea generally breaks; a sand cay on its north extreme dries 5 feet at springs. The current deflected to the north-west by this part of the reef, often gives the appearance of the reef extending farther in that direction than it actually does.

A vessel approaching Mafia channel from the northward, should sight Niororo island; in clear weather, the high tree standing up like a pillar can be seen at a distance of 14 miles.

Anchorage will be found about 4 cables to the westward of the north point of Niororo island, in 9 fathoms, sand.

Banks.—Northward of Niororo island, in the approach to Mafia channel, are a number of banks which can be passed over, with the exception of Muni patches (page 325), Gordon reef and Vulture bank. All these patches can be made out in smooth water by the swirls on them, but the bottom is not generally visible.

Gordon reef is a sunken danger with only one fathom water. It lies N.N.E. $\frac{1}{2}$ E., distant $3\frac{1}{2}$ miles from Niororo island.

Vulture bank is about $1\frac{1}{2}$ miles in extent, within a depth of 10 fathoms; there is one head with 2 fathoms water, which lies with Niororo island, bearing S.W. $\frac{1}{2}$ W., distant $6\frac{1}{2}$ miles. When entering Mafia channel, no vessel should be as far eastward of Niororo as this danger.

Fawn bank.—This extensive bank, $6\frac{1}{2}$ miles to the northward of Niororo island, is $5\frac{1}{4}$ miles in length, with from 5 to 17 fathoms on it, and lies across the north entrance of Mafia channel.

Shungu Mbili just open westward of Niororo island, S. $\frac{3}{4}$ W., leads over Fawn bank in 10 fathoms water, and westward of Gordon reef.

COAST.—Northward of the Rufiji delta, the coast, mostly sandy beach, fronted by a mud bank dry at low water, trends, with no important projections, north-eastward for 35 miles, when it curves round Shungu bay eastward to Ras Pembamnasi. The coast, intersected by many small streams, is dotted with villages, the most important of which are Kavinja, about 5 miles northward of the Kikunya, mouth of the Rufiji; Kivumungao and Yandope, 7 and 8 miles farther north; Kisju, abreast Kwale island; and Bosa, abreast Fanjove island.

Some of the rivers have large mouths, which dhows enter to trade, but all are closed at low water springs. The country in this vicinity produces much copal and india-rubber, and near the sea it is well cultivated and populated. At 6 miles inland the Mtoti hills, a flat-topped range, averaging 600 feet in height, trend parallel to the coast.

Off the coast are several small islands, and outside these again are a number of dangers known as the Kwale reefs, most of which only show at low water springs, the water being muddy. These islands and reefs break the ocean swell, and except at places abreast the channels between them, the water is smooth and landing easy all along the shore in ordinary weather.

The water deepens very gradually along this coast, but there is a navigable channel for small vessels inside the islands, and the

bottom is soft mud. The best water lies generally on the islands side. Dhows invariably use this route.

Tides and currents.—The tides are strong in all the channels, and all along the shore; the flood stream running southward and towards the shore, the ebb to the northward and outwards. Eastward of Kwale reefs there is sometimes a continuous northerly current, but this depends on the wind.

Koma island is of coral, one mile in diameter, and the tops of the trees are 70 feet above high water. Its western point is $5\frac{1}{2}$ miles from the main land, with depths of 3 to 4 fathoms in the channel between. The island stands on a reef which extends 2 miles north-eastward, having several small bush-covered islets on its outer part, the northern and largest of which is Pemba-juu.

Supplies.—Bullocks, fowls, and goats are procurable at Koma at a cheap rate, and there is a well of good water easy of access near the west point.

Anchorage.—There is good anchorage in either monsoon northward of Koma island, in 6 fathoms, mud, with Pemba-juu islet bearing E. by S., distant three-quarters of a mile.

Hatambura, a rocky, wooded islet, $2\frac{3}{4}$ miles north of Koma, is surrounded by a narrow reef with 5 and 6 fathoms water close-to.

Kwale island, situated $7\frac{1}{2}$ miles northward of Koma island, is of coral, $2\frac{1}{2}$ miles in length, and three-quarters of a mile in breadth; the tops of the trees are about 100 feet above high water. No supplies are to be obtained from the village; the water is unfit for use.

The island is bordered by a large reef, on which, to the eastward and southward, are three bushy islets. The easternmost of these, Chokaa, is 40 feet high, and one mile from Kwale, and the trees on it show darker than those on the other islets. The channel inside Kwale island is narrow, and has a maximum depth of $2\frac{1}{2}$ fathoms at low water springs, mud bottom.

North Fanjove island, situated 5 miles north-eastward of Kwale, is sandy, covered with trees 60 feet high, and surrounded by a reef which dries to the distance of about half a mile. Several islands lie between it and Kwale.

Dira reef, lying nearly midway between Koma and Niororo islands, is 3 miles in length, with a sand-bank on its south-west side, which dries 10 feet at low water springs; it generally shows, and the sea always breaks. It is the outermost of the Kwale reefs, and forms the western boundary of the north entrance to Mafia channel.

From the sandhead, Niororo island bears S.E. by E. $\frac{1}{4}$ E., distant $7\frac{1}{2}$ miles.

At 3 miles S.W. by W. is the northern extreme of a reef about one mile in extent, and awash at low water springs; this reef is the southernmost of the Kwale reefs.

A Five-Fathom patch lies E. by N. $\frac{1}{2}$ N. $1\frac{3}{4}$ miles from the north-east extreme of Dira reef; there may be less water.

Ukamba reef lies 9 miles north of Dira reef, and $6\frac{1}{2}$ miles E.S.E. from the north-eastern Chokaa islet. Its sandhead dries 10 feet at low water springs, but being of a more reddish tinge than usual, is not so conspicuous, and the sea does not always break at high water. Between Ukamba reef and Kwale island, and also westward of Dira reef, are several other reefs mostly awash at low water, with navigable channels between them. No further descriptions are necessary for these reefs, as they lie out of the track of vessels.

Muni patches are three small coral heads with a least depth of 2 fathoms, rising abruptly from deep water. The easternmost patch lies 4 miles E. by S. from Ukamba reef. The position of these patches will only be known by the tide swirls.

Field patch is a small 5-fathom head rising from a bank with 15 fathoms, and lies $16\frac{1}{2}$ miles north of Niororo island, with Fanjove island bearing W. by N. $\frac{1}{4}$ N.

Sukuti reef, situated between 2 and 6 miles northward of Fanjove island, and from 3 to 6 miles from the mainland, is the northernmost and largest of the Kwale reefs. It is of an irregular shape, 4 miles in diameter, and forms the south side of Shungu bay. There was one mangrove tree on its western side in 1877, where is also a coral head that dries 10 feet at low water. The sea always breaks heavily on the outer edge of Sukuti reef.

Vyumbani are three small reefs awash, which lie S.W. by W. $\frac{1}{2}$ W. 2 miles from the western part of Sukuti reef, and $2\frac{1}{2}$ miles from the main land.

Channels.—There is a clear deep channel between Fanjove island and Sukuti reef $1\frac{1}{2}$ miles wide. The north side of Dendeni river entrance bearing W. $\frac{3}{4}$ N. leads through. A high clump of trees there usually shows out well.

There is a navigable channel inside Sukuti and Vyumbani reefs, with 3 fathoms at low water springs, but the latter reefs do not show at high water.

Anchorage.—There is good anchorage for small vessels in

either monsoon, in 4 fathoms water, westward of Sukuti reef, with the mangrove on that reef bearing S.E., distant $1\frac{1}{2}$ miles, and the right extreme of Ras Pembamnasi N.E. $\frac{1}{4}$ E.

Binga hill is an isolated flat-topped elevation, 530 feet high, rising 8 miles north-westward of Dendeni river and conspicuous from the anchorage.

Shungu bay, within Pembamnasi, is all shallow, the 3-fathom line being about $1\frac{1}{2}$ miles off shore. The Shungubueni river, which falls into the sea at its southern part, is of considerable size at the mouth, but dries across at low water springs; a rock, 6 feet high, lies nearly one mile off its mouth. A boat can ascend for several miles at high water.

Ras Pembamnasi, the eastern point of Shungu bay, is low and of mangrove, backed by higher trees. The shore reef dries off for half a mile, and there is a detached breaking patch two-thirds of a mile from the eastern extreme of the point; a rock awash at low water springs, lies one mile south-west of the point.

Buuni bay, lying between Ras Pembamnasi and Ras Mwamba Mkuu, is a sandy bay 3 miles across and open to the south-east, a large portion of which is shallow. Some red cliffs a little southward of the village in the centre of the bay show well with the sun in the east.

Ras Mwamba Mkuu is formed of high mangroves, bordered by a reef which dries off one mile southward; a 3-fathom tail extends south-west for another mile. Also a patch of 2 fathoms, half a mile in extent, lies S.S.W. $2\frac{1}{2}$ miles from the point, and 2 miles from the red cliffs in the centre of the bay.

Anchorage.—During the northerly monsoon there is anchorage in Buuni bay, protected by Mwamba Mkuu.

To enter the bay, steer for the Red cliffs bearing N.W. by N., which will lead between the 2-fathom patch and the reef, in 5 fathoms water; when the right extreme of Ras Mwamba Mkuu bears N.N.E. $\frac{1}{2}$ E., haul up for it, and when the south end of Ras Mwamba Mkuu reef bears East, anchor in $5\frac{1}{2}$ fathoms, sand and mud. Or if from the southward, steer for the highest trees on Ras Pembamnasi when bearing N.N.W., until the right extreme of Ras Mwamba Makuu bears N.N.E. $\frac{3}{4}$ E., then steer for it, which will lead between the 2-fathom patch and the breaking reef off Ras Pembamnasi in $4\frac{1}{2}$ fathoms, when anchor as directed.

COAST.—From Ras Mwamba Mkuu the coast trends northward

7 miles to Ras Kanzi ; the southern portion for 3 miles is low and swampy, thence it rises into cliffs which at Puna point are 80 feet high ; here the reef approaches within a few hundred yards of the shore with deep water close-to. About Ras Kanzi are a great number of palmyra palms, which form a good distinguishing mark, as there are none elsewhere on the coast.

Puna hill is a small isolated rounded hill 240 feet high, rising $3\frac{1}{2}$ miles at the back of Puna point, and is most conspicuous from the southward. Continued at page 332.

Current.—The current off Mafia island is nearly continuous to the N.N.W., but varies much in velocity from one to as much as 4 miles an hour, depending principally on the force and direction of the wind in the regions to the southward.* The breadth of the current belt also varies much, being sometimes only 30 miles off-shore, at other times considerably more. It is therefore very difficult to predict its rate when approaching the coast from the eastward. A vessel should, however, always steer well to the southward and make Ras Mkumbi (Moresby point), when bound for Zanzibar, to insure giving that dangerous Latham island a wide berth.

North-westward of Ras Mkumbi, the western limit of the current at times does not reach beyond midway from Latham island to the main land, at which times even in the southerly monsoon a southerly set may be experienced about Ras Kimbiji, but more generally at this season the current strikes the shore somewhere near Ras Kimbiji and runs along the coast to the northward. On the bank of soundings north-west of Ras Mkumbi, the movement of the water is tidal, flood to the south-west, and ebb to the north-east, but varying several points either way. See currents p. 331.

Winds.—The seasons at Mafia island are similar to those of Zanzibar, and like them are very changeable, but the wind in Mafia channel is more steady during the day than in Zanzibar channel. There is more rain about Ras Kisimani than anywhere else in the island of Mafia. See pages 361, 362.

DIRECTIONS for MAFIA CHANNEL.*—A vessel bound to the southward through Mafia channel, after passing Ras Kimbiji, should steer so as to pass about 8 miles eastward of Ukamba reef, and sight Niororo island on a S. by W. bearing. The highest trees on Shungu Mbili and Niororo can be seen in clear weather at a distance

* Little or no advantage would be gained by a vessel proceeding northward using Mafia channel, as there is a favourable current eastward of the island, and no dangers. See current arrows on charts.

of 14 miles from the deck. Bring Shungu Mbili just open to the westward of Niororo island bearing S. $\frac{3}{4}$ W., and steer for it over Fawn bank, in 10 fathoms water, until within about 2 miles of Niororo island, when alter course to pass westward of Niororo reef, which can always be seen when near.

From abreast Niororo reef, steer S. by W. $\frac{1}{2}$ W. until Niororo island bears N.E. $\frac{3}{4}$ N., then keep it on this bearing astern, steering S.W. $\frac{3}{4}$ S.; this course will lead in mid-channel as far as Sefo reef, the sand on which should be made out at least 2 miles distant, even if covered. The outline of Mafia island will be visible when Shungu Mbili island is abeam. When Sefo reef is in sight, steer to pass three-quarters of a mile north-west of the sandhead, and when it bears E.S.E., Ras Kisimani will bear S. $\frac{1}{2}$ E., then steer South, observing that Sefo sandhead, bearing N. $\frac{3}{4}$ E. astern, clears Al Hadjiri reef. This South course, if preserved, will lead clear of all dangers as far as Mange reef.

If possible, low water should be chosen by a stranger in using this channel, as at high water the bank extending northward from Maduvi reef is not plainly seen. Northward of Ras Kisimani, there is at times a set north-eastward, which must be guarded against.

[The channel eastward of Sefo reef is much wider than that to the westward, and may be taken if preferred, but at high water the eastern part of Sefo reef is not clearly seen, and Salim bank is not seen at all. The eastern extremity of Boydu trees kept bearing S.W. $\frac{3}{4}$ S. until Sefo sandhead bears N. $\frac{3}{4}$ E. is the only mark that can be given. The western passage has the advantage of one straight course from Sefo reef.]

When Maduvi reef is abeam, a South course should clear the tail of Belami reef, but either the extreme of Ras Kisimani bearing N. by E. $\frac{1}{2}$ E. astern, or Mange sand S. $\frac{1}{4}$ W. will clear it. When the red cliffs of Dongo Jekundu bear East, the south end of Belami reef will be abeam. Mange sand at low water springs, will be seen from abreast Ras Kisimani, and it can at all times be made out 2 miles off, even when covered, which is only at near springs. Pass one mile westward of Mange reef, and when it is abeam, steer S.W. by S. until the trees on Simaya island, which are visible at a distance of 14 miles, are seen on the starboard bow.

In proceeding to Kilwa Kivinje, it is better to take the western channel, between Membeuso and Banda reefs, as it is the clearer and the water smooth, whereas there is often considerable swell in the eastern channel. Pass about 2 miles eastward of Simaya, on the

S.W. by S. course, already directed, using that island with Okuza and Nyuni, to determine the position of the vessel, until Machanga sand cay (which dries 10 feet, and may usually be made out from a distance of 2 miles, even when covered) is seen. On this course Membueso reef, which dries 8 feet, and can generally be seen, is left one mile to the westward; Simaya island bearing N. by E. astern, leads eastward of it and nearly in mid-channel. From abreast Membueso, steer about S.S.W. to pass within half a mile westward of Machanga sandhead, and the same distance eastward of Choca, and when Machanga bears N.E. $\frac{3}{4}$ N., steer South. Choca reef is not well seen, its highest part being 2 miles westward from its eastern extreme.

Poiasi and Pwajuu reefs are steep-to, and easily made out; the course South should lead half a mile eastward of them and $1\frac{1}{2}$ miles westward of Val rock. When the high trees on the north end of Songa Songa bear N.E. $\frac{1}{2}$ N., keep them on that bearing astern, until Jewe reef, which is steep-to and generally visible, is seen on the port bow. When the eastern tangent of Singino hill bears S. $\frac{1}{2}$ W. steer for it, which will lead westward of Jewe reef and to the anchorage off Kilwa Kivinje, *see p. 303, 304.*

CHAPTER IX.

RAS KIMBIJI TO PANGANI BAY, INCLUDING ZANZIBAR ISLAND AND CHANNEL.

(Lat. 7° S. to lat. 5° 25' S.)

VARIATION IN 1889.

| | | | | | | |
|------------------|---|---|---|---|---|---------------------|
| Ras Kimbiji | - | - | - | - | - | $10^{\circ} 10' W.$ |
| Latham island | - | - | - | - | - | $10^{\circ} 0' W.$ |
| Zanzibar harbour | - | - | - | - | - | $10^{\circ} 0' W.$ |

LATHAM ISLAND or FUNGU KISIMKAZI* is a low dangerous coral and sand island, in the fairway of vessels approaching Zanzibar channel from the eastward, in lat. $6^{\circ} 54' 5''$ S., long. $39^{\circ} 55' 45''$ E., and S.E. by S. nearly 36 miles from Ras Kizimkazi the south extreme of Zanzibar, and East northerly 23 miles from Ras Kimbiji. It was discovered by the East India Company's ship *Latham* in 1758, and is of an oval form 350 yards long north and south, and 180 yards broad. Its surface, 10 feet above high water, is quite flat, apparently made so by the constant treading of myriads of sea fowl that have consolidated the sand collected on the coral substratum into a soft sandstone, which shines very white in the sun, but with a bad light, or at night it is difficult to see.

The island is surrounded by a coral ledge which dries to the distance of one cable, with a sunken rock at $1\frac{1}{2}$ cables from the north-east point. The sides of this ledge are tolerably steep, sloping off rapidly to 3 fathoms, except north and eastward, where that depth will be found at 3 cables from the island.

* See Admiralty charts:—Zanzibar and Pemba islands, No. 664; Ras Tikwiri to Zanzibar channel, No. 662; and Pangani to Ras Kimbiji, including approaches to Zanzibar, No. 640 *a* and *b*; scale, $m=0.5$ of an inch.

A sand-bank shifts from the northern to the southern end, and *vice versa*, according to the monsoon, being always at the lee side, and on this it is practicable to effect a landing in moderately calm weather. Two or three vessels have been totally lost on Latham island.

Beacon.—To make the island more conspicuous, a beacon, 35 feet high, was erected by the officers of H.M.S. *Shearwater* in 1873, but, as no mortar was used, it was blown down, the base only remaining. It has been rebuilt, but no dependence should be placed on its standing. Cocoa-nut trees were planted by the *Shearwater*, but have not flourished, the birds having destroyed them.

Latham bank.—Anchorage.—The bank surrounding Latham island extends 5 miles north, 4 miles south, 2 miles east, and half a mile west. These are the distances of the 20-fathoms line of soundings from the island, outside of which the water rapidly deepens to 200 fathoms. The greater part of this area has a depth of from 5 to 10 fathoms, sand, with large lumps of coral scattered about, and the water is so clear that the bottom can be plainly seen. Anchorage may be taken north or south of the island, depending on the monsoon. In moderate weather it is a good place for a vessel to anchor for the night, when too late to get on to Zanzibar; but there is a nasty cross swell on the bank, rendering the anchorage an uneasy one.

This bank may be run for in safety at night with slow speed and the lead kept going, from any direction but the westward, the soundings on that side being more abrupt than on the other sides. The bottom has been clearly seen by moonlight in 10 fathoms.

From the masthead of a vessel at anchor, the mainland at Ras Kimbiji is just visible on a clear day.

The bank is well adapted for a watch place when cruising, as it lies in the track from Zanzibar southward. There is good fishing on the bank.

Tides and Currents.—The currents on Latham bank are variable, but on either side of it, directly the deep water is gained, it runs with considerable velocity to the northward all the year round. During the south-west monsoon about 2 knots an hour may be taken as the average, with 4 knots as a maximum. In the north-east monsoon about $1\frac{1}{2}$ knots is the average. At 5 miles westward of Latham island, the current is much weaker. *See currents p. 327.*

It is high water at Latham island, full and change, at 4h. 0m.; springs rise about 10 feet.

COAST.—**Ras Kimbiji**, a clifly, but low, promontory on the mainland, with a village of the same name close northward of it, lies $1\frac{1}{2}$ miles northward of Ras Kanzi (page 327). Its position will be known by a rounded hill 150 feet high, conspicuous by its isolation, which rises 2 miles within the point. This hill might be made if certain of the vessels position, when coming from the southward or eastward and proceeding for Zanzibar, but must not be confounded with another solitary hill to the southward, much more conical in appearance.*

Fungu Miza is a narrow reef, 2 miles long, extending parallel to the coast ; its south end lies $1\frac{1}{4}$ miles from Kutani cliff and village, with Ras Kimbiji bearing S. $\frac{1}{2}$ E. At low water, springs, the reef is dry one foot for the distance of three-quarters of a mile from its south extreme ; at the northern end is a rock with one fathom of water, and 3 fathoms over the centre of the reef between, on which the sea generally breaks. There is a depth of 6 fathoms between the reef and the shore.

Ras Manamku is a red cliff point 6 miles northward of Ras Kimbiji, and $2\frac{1}{2}$ miles beyond is Ras Ndege. The coast, varied by cliffs and white sandy bays, is higher than any part of the land for some distance to the northward. At the village of Kutani the cliffs are 70 feet in height, and of a red colour.

Anchorage.—Between Ras Kimbiji and Ras Ndege the water is deep, the 100-fathoms line of soundings being about 2 miles from the shore, but anchorage can be obtained anywhere, in about 14 fathoms, at the distance of one mile, except near Fungu Miza. Care must be taken, however, not to run in too rapidly in seeking a berth, as the depths decrease suddenly from 35 to 15 fathoms, and from that again to shoaler water.

Ras Ndege is a clifly cape, conspicuous when coming either from the northward or southward, and forms the south-west point of the southern entrance of Zanzibar channel. It is abrupt, steep-to, and about 30 feet above high water, the cliffs being 10 feet. The point is backed by low rounded hills.

Coasting craft working southward along the mainland, meet the current off Ras Ndege, which makes it a difficult point to pass in the S.W. monsoon ; but there is good anchorage for dhows or boats one mile westward of the point.

* See Admiralty chart :—Pangani to Ras Kimbiji, including the approaches to Zanzibar, with views, No. 640 *a* and *b*, in 2 sheets ; scale, $m=0'5$ of an inch.

From Ras Ndege the coast trends westward for 5 miles to Ras Koronjo, generally sandy beach, but with one or two small cliffs.

Dhow harbour is the name given to the anchorage between the reef extending westward from Ras Ndege and a similar tongue of coral extending northward from the coast at one mile farther west. A good berth in 2 fathoms will be found with Ras Ndege bearing E. by S. $\frac{1}{2}$ S., and a piece of low cliff on the coast, $1\frac{1}{2}$ miles west of Ras Ndege, W. by S. $\frac{1}{2}$ S. Here in the south-west monsoon period are generally a collection of dhows waiting for a lull to clear the point. The Ndege, a small stream, enters the sea at the head of the bight formed by Ras Ndege, but the sand dries across its mouth at low water.

Mboamaji village is situated on the beach $2\frac{1}{2}$ miles westward of Dhow harbour. A curve in the coral ledge fronting it forms a good landing place at low tide.*

Kikwero reef.—Off Mboamaji village, and one mile from the shore, is a coral patch awash at low water. Outside this, and separated by a channel one-third of a mile wide, and 8 fathoms deep, is Kikwero reef, three-quarters of a mile in length, dry 2 feet at low water springs, and steep-to, with 7 fathoms all round ; the sea always breaks.

A patch with $3\frac{1}{2}$ fathoms lies in a north-east direction from Kikwero reef, distant three-quarters of a mile, with the north extreme of outer Sinda island distant 2 miles, and in line with the left extreme of inner Makatumbe island.

Ras Koronjo is a clifly point 2 miles westward of Mboamaja, with a rock 6 feet above high water at $1\frac{1}{2}$ cables distant ; the coral ledge dries in a north-west direction for three-quarters of a mile beyond the rock.

Ras Mjimwema.—Between Ras Koronjo and Ras Mjimwema 3 miles north-westward, the coast forms a low and sandy bay, backed by mangrove swamps ; the large village of Mjimwema stands a little south-eastward of the point, and as the shore is steeper than usual, there is good protection in the south-west monsoon as already mentioned.

Ras Mjimwema is a low rounded sandy point distinguished by high cocoa-nut trees round the villages of Magogoni, Mjimpia, and Mjimwema. From Mjimwema the coast forms a slight bay westward for 2 miles to Ras Rongoni the rocky east point of Dar-es-Salaam harbour, the red cliffs of which are from 15 to 20 feet high.

* See Admiralty plan of Dar-es-Salaam, No. 674.

OFF-LYING ISLANDS.—A little westward of Ras Ndege commences a chain of islands and reefs, which skirt the coast for about 20 miles, as far as Fungu Yasin. These islands and reefs afford shelter to several anchorages, and lie at an average of 2 miles from the mainland. About midway on the coast is also the land-locked harbour of Dar-es-Salaam.

Sinda islands, situated between one and 2 miles northward of Ras Koronjo, are two coral islands on a bank one mile in diameter. The outer island is somewhat the larger being half a mile long, and distinguished by ragged and bare looking trees that dot its outer edge, hanging over the cliffs, and about 50 feet above high water. From the southern end of the outer island a chain of islets extends southward along the edge of the coral bank. Inner Sinda island is 40 feet high, and has white sand on both north and south points.

Millard bank, one mile in length, with a least depth of 3 fathoms, lies off outer Sinda island, with a channel 7 fathoms deep between. From the shoalest spot, at the north end, the east extreme of outer Sinda island bears S. by E. $\frac{3}{4}$ E. distant $1\frac{1}{4}$ miles.

Gunga peak in line with Ras Kankadya bearing N.W. by W. $\frac{1}{2}$ W. leads about $1\frac{1}{2}$ miles northward of it. This bank cannot be distinguished until close upon it, when the bottom can be clearly seen.

Mboamaji harbour is the name given to the anchorage within the Sinda islands. It is fairly protected by the surrounding reefs, but in a strong monsoon, especially the north-east, the swell sets round the islands.

Anchorage.—The best anchorage in the south-west monsoon period is in 10 fathoms, sand and mud, with the south-west sand point of inner Sinda islands bearing S.E. by E. $\frac{1}{2}$ E., and the north point of outer Sinda E.N.E. There is also fair anchorage off Mjimwema village in 6 fathoms, sand, with the north extreme of Kendwa island bearing N.N.W. $\frac{1}{2}$ W., and the white house in Mjimwema village W. by S. $\frac{3}{4}$ S. Dhows and vessels of 10 feet draught may anchor close off the village, well sheltered. In the north-east monsoon the best berth is to the southward of Inner Sinda island in 6 fathoms, sand, with its south-west sand point bearing N.N.E. distant 2 cables.

The currents at this latter anchorage are strong. At the end of the flood, especially in the north-east monsoon, the stream runs rapidly to the eastward, and causes a vessel to swing to the swell in a most unpleasant manner.

Directions.—To enter Mboamaji harbour from the south-eastward, keep the inner Makatumbe island well open northward of outer Sinda island, to clear Kikwero patch, until the Sinda islands appear to touch, when steer for them, passing about 3 cables off the islets on Sinda reef; the eye will guide to the anchorage.

To enter from the northward, west of Millard bank, from abreast the Makatumba group, distant one mile, bring the south-west point of inner Sinda island to bear S.S.E., and steer for it.

Kendwa island, half a mile in extent, is situated on the outer edge of the coral ledge fronting Ras Mjimwema to the distance of one mile. Its trees are 40 feet above high water, and its outline level and uniform.

Between Kendwa island and Makatumbe reefs, is a boat channel half a mile wide.

Boats working to windward in the north-east monsoon should run under the lee of Makatumbe island through this channel, but in the south-west monsoon, at low water, the sea sometimes breaks right across, and discretion must be used as to taking the channel.

DAR-ES-SALAAM BAY, the outer anchorage of Dar-es-Salaam, lies between Kankadja promontory and the Makatumbe group. The centre of the bay is obstructed by Daphne reefs. During the south-west monsoon the bay is well protected by the Makatumbe group, but during the north-east season a considerable swell sets in with a strong wind. Still, for a small vessel, which can lie near Inner Makatumbe island, there is some shelter.

The shore of the bay is broken and indented, and presents to the eye a low outline, nearly uniform in height, but much diversified by alternate sand beaches and cliffs. Inland, at a distance of 12 miles, are mountains rising to a height of 1,200 to 1,500 feet. This chain extends south-westward and terminates abruptly.*

Shallow water extends from the head of the bay to a considerable distance, the 3-fathoms line of soundings being $1\frac{1}{4}$ miles from the beach. At low water springs, sand banks and coral ledges dry off a distance of 6 cables. The flat between Makatumbe group and the main has an average depth of 9 feet water, but on its extreme edge and near the entrance to the harbour channel is a 3-feet rock, with $2\frac{1}{2}$ fathoms close-to. From the rock, the house in ruins on Inner Makatumbe island bears E. by N., distant half a mile; it does not generally show.

* See Admiralty plan:—Dar-es-Salaam bay and adjoining anchorages, with views, No. 674; scale, $m = 1\frac{1}{5}$ inches.

Makatumbe group is a collection of two small islands and several islets, standing on the large coral reef forming the east side of Dar-es-Salaam bay. The inner island is 2 cables in diameter, with several high trees near its centre, which make it somewhat remarkable. There is also a stone house, in ruins, near which is a large masonry-faced well, but the water is not fit to drink. In this island most of the stone was quarried with which the town of Dar-es-Salaam was built. The outer island is of the same size, but not so high.

The reef, on which the group stands, dries at low water springs, is $1\frac{1}{4}$ miles in extent, and steep-to on the eastern side; off the north point the bottom shelves from the 5-fathoms line, which is 4 cables northward of Hammond rock; the western edge has also a gradual slope, but the southern is shoal as before mentioned.

Hammond rock, the northern islet of the group, is 6 feet above high water, and forms a good guide when rounding them.

Daphne reefs.—Midway between the Makatumbe group and Ras Kankadya, and lying in the centre of Dar-es-Salaam bay, are the three Daphne coral reefs. The outer and largest is three-quarters of a mile in length, with a least depth of 2 fathoms water; this shallow part can at times be made out, but it would not be safe to trust the eye.

The middle reef lies half a mile south-west of the outer reef with 3 fathoms least water.

The inner reef is 3 cables in diameter, with several rocky heads of one fathom water, which occasionally break. It lies 3 cables within the middle shoal, and 9 cables from the shore. Gunja peak opens northward of Ras Kankadya, leads half a mile northward of Daphne reefs; the western extremes of Bongoyo island, in line, also lead northward of them.

A boat, working up in the north-east monsoon, would do well to work up inshore of the inner reef, and when in its vicinity should tack directly the south extreme of Bongoyo island opens off Ras Kankadya.

Directions.—Approaching Dar-es-Salaam bay from the northward, Mbudya island will be first distinguished by its clump of trees. This island should be given a berth of at least 4 miles in order to pass outside Mbudya patches, as it is quite possible that shoaler patches than those marked on the chart may have escaped detection. Steer along the shore at this distance until Inner Makatumbe island (which has a clump of trees on it) bears S.S.W.

Then steer for that island until the white tombs on the red cliffs of Ras Chokir bear S.W.; this latter mark will lead midway between Daphne reef, and the spit extending from Hammond rock; and when the flagstaff on Ras Rongoni (or the middle of its red cliff) bears S.S.W., steer for it. This mark will lead through the bay, and when Inner Makatumbe bears S.E. by S., haul towards it for anchorage, unless entering the harbour, in which case proceed as directed on *p. 339*. The Makatumbe reef always breaks, and can easily be made out, but Daphne reefs are not plainly visible.

In approaching Dar-es-Salaam from the southward, Sinda island will first come into view, and may be distinguished by the ragged trees lining its eastern edge. Give this island a berth of two miles to clear Millard bank, keeping Gunja peak in line with Ras Kankadya; steer on this line about N.W. by W. $\frac{1}{2}$ W., until Kendwa island is abeam, when alter course and bring Hammond rock a little on the port bow, and round it at the distance of three-quarters of a mile, with Ras Chokir bearing S.W., as above directed.

Anchorage.—The best anchorage in either monsoon for vessels of moderate draught is in 4 fathoms, mud, with the house in ruins on Inner Makatumbe bearing S.E., and Hammond rock N.E. by E. A small vessel can with advantage lie nearer Makatumbe.

Tides and currents.—The tidal streams in the vicinity of Dar-es-Salaam bay are variable and uncertain. The change of the monsoon works an entire reversal, in most instances, of their directions and forces. As a general rule, the flood runs north-westward, and the ebb in the contrary direction, but amongst the islands and reefs the streams will often be found setting to the opposite points. In the south-west monsoon, at 6 miles from the land, the current runs continually north-westward, at rates varying from one to 3 knots an hour. In the north-east monsoon, on Mbudya patches, the flood runs north-west, and the ebb south-east, while, at the same time, inside Bongoyo island these directions are reversed.

In Dar-es-Salaam bay it is impossible to give any rule, but the velocities there are not usually great.

DAR-ES-SALAAM HARBOUR is land-locked, the water is of a convenient depth for anchoring, and the shores are steep. There is room for a large number of vessels; and yet not space for any sea to get up, even to interfere with boat traffic. It is the natural locality of the great trading port of the east coast, and was recognized as such by the late Seyd Majid, Sultan of Zanzibar, who

commenced to build on a large scale, and intended to direct the Bagamoyo trade hither. His death prevented this project being carried out.*

The harbour is the lower portion of a long salt water inlet about 4 miles in extent, and might be made available for 3 miles as a port. The anchorage immediately off the town is in a reach three-quarters of a mile in extent. The shore of this reach is surrounded by cliffy land 20 to 30 feet high, generally steep, and, at the town side, ascended by three flights of stone steps. On the west is a shallow mangrove-lined creek. To the south the inlet extends for 2 miles without a turn, a third of a mile in width, and bordered by the same steep banks, but faced by mangroves. The bottom is mud and sand, with an average depth of 5 fathoms, the water is thick and muddy.

The narrow entrance to Dar-es-Salaam harbour is not easy to make out, even from the anchorage in the bay. It lies between the red cliffs of Ras Rongoni and Ras Chokir, through an abrupt break in the coral reef bordering the shore. The break in the reef at the entrance, abreast North Sand head, which dries 2 feet at springs, is about $1\frac{1}{2}$ cables wide, reduced to about one cable at low water, at about one mile within, between East and West Ferry, two low sandy points.

A rocky patch projects from the North Sand head, south-westward, into the channel, which presents the greatest difficulty in the passage, narrowing it, at the turning point, to 120 yards; thence the channel is straight towards East Ferry point, and has a depth of 21 feet, with the exception of a small bank with 16 feet at low springs lying in the fairway about 4 cables from East Ferry point; this bank may be passed on either hand, but, until buoyed, it will be difficult for a stranger to avoid. The passage between the Ferry points is on a curve, but it is easy to keep in mid channel. There is a patch with 3 fathoms water, off the town.

On West Ferry point is a solitary baobab tree, used as a leading mark. A little to the westward a grove of tall cocoa-nut trees line the beach, and hide the houses of Dar-es-Salaam; more to the westward are the huts of the village of Mjimwena,† and the Red cliffs of Ras Chokir are conspicuous. The latter are not of large extent, and only 30 feet high, but are of a deep colour, and topped by a cemetery, the white tombs of which show out well.

East Ferry point is a little higher than the other, and has 3 large

* See plan of Dar-es-Salaam harbour and view, on sheet No. 674.

† Another village of this name stands on the shore, about $2\frac{1}{2}$ miles eastward of the entrance of the harbour.

baobab trees near it, and a few cocoa-nuts ; to the eastward are mangroves, and then the cliffs of Ras Rongoni. These are not so high as those of Ras Chokir, but are much longer, and of about the same colour.

Beacons.—A flagstaff has been erected about 100 yards within Ras Rongoni, and a similar one on the coral ledge about 70 yards seaward of the point ; these in line, bearing S. $\frac{3}{4}$ W., lead in the fairway to the point. Flagstaffs have also been erected at the West Ferry baobab tree, and north extreme of Cocoanut clump (marking View A line). A buoy occasionally marks the south-east extreme of the spit extending from North Sandhead.*

Directions.—To enter Dar-es-Salaam harbour, the time of low water should be chosen, if possible, as then all the reefs plainly show, and the banks on either side of the approach can generally be made out from aloft. In no case should a vessel attempt it during the full strength of the flood stream, nor should she leave during a strong ebb.

From abreast Inner Makatumbe island, bring the flagstaffs at Ras Rongoni in line, bearing S. $\frac{3}{4}$ W., and steer for them (which line will carry not less than 21 feet at low springs) until the flagstaff at the northern end of a clump of cocoa-nuts on a cliff that shows over West Ferry point comes in line with the flagstaff at the baobab on West Ferry point, bearing S.W. by W. $\frac{1}{2}$ W.* (View A on plan). The vessel will then be about one cable outside the rocky spit which extends south-westward from North Sand head, and may commence altering course gradually to starboard, carefully rounding the rocky spit, being guided by the distance from North Sand head, which dries 2 feet at springs, and is usually visible from the deck,* until the leading (View A) mark is again brought in line. Steer in on this line until nearly abreast East Ferry point, and thence keep in mid-channel by eye, taking care to turn sharply to starboard round West Ferry point, as the bank on the port bow extends about one cable off Ras Makabe on all sides ; the ebb tide also sets strongly towards that bank. Anchor as convenient off the town.

Tides.—It is high water in Dar-es-Salaam harbour, full and change, at 4h. 20m. ; springs rise 14 feet, but neaps range as little as 5 feet. The stream at springs runs very strongly in the harbour channel, especially towards or after low water, as it is then confined to the channel itself. The ebb sets straight over the flats towards Makatumbe

* The clump of cocoa-nut trees, its own breadth open of the baobab on West Ferry point clears the tail of the spit, but it is recommended, should the buoy be adrift, to re-buoy the end of the rocky spit extending into the channel, before entering.

islands, so that a vessel on reaching the turning point off Ras Rongoni in her passage out, must take care, if *obliged* to choose that time of tide, that she is not swept on to the shoal water beyond.

Dar-Es-Salaam town stands above the bank on the north shore of the harbour. The palace, originally intended for the Sultan, is the westernmost house on the bank, and a flagstaff is erected near its north front. The houses only half built, have been left in that unfinished state and were in 1874, gradually falling into decay, looking more like ruined houses than incomPLETED ones, on account of the vegetation which climbed around them. There was, however, a considerable population living in the mud huts around these apparent ruins, and the village Mjimwema may be said to be a part of Dar-es-Salaam.

There is a governor here, with a guard of the Sultan's soldiers, and a custom house official.

A large tract of land at the back is planted with cocoa-nuts, belonging to the Sultan. There is some trade with the interior, caravans of ivory and other produce occasionally arriving for shipment at Zanzibar. Great stimulus to trade will probably be given here by the opening up by the Germans of the country behind Dar-es-Salaam. A road was, in 1874, in course of construction for wheel carts between this town and the northern end of Nyassa lake.

Position.—The position of the Sultan's flagstaff is lat. $6^{\circ} 49' 41''$ S., long. $39^{\circ} 17' 8''$ E.

Water.—There are several good wells. . The best and most convenient is in the Sultan's grounds, at the back of his palace. There is another at the Mosque, close to a small house with a dome; but there might be some difficulty about boats filling their barricoes there, though it is outside the mosque wall. A third is at a Banian's house, some way inland to the north-eastward.

Caution.—The well which is most conveniently situated close to the beach, in the bank to the eastward of the unfinished buildings, should be carefully avoided.

Inlet.—Above the town the inlet of Dar-es-Salaam extends 2 miles in a S.S.E. direction, then turns south-westward, and continues the same breadth for another mile. It is navigable for vessels almost up to this point, but here at low tide it may be said to come to an abrupt termination, as a sand-bank dries nearly across the channel. Above this it divides into two branches, one extending south-south-westward, the other and larger, south-eastward, with high banks on either side. Both branches are nearly

dry at low water springs, and as little fresh water comes down them, except during the floods, the statement of the natives that they end in mangrove swamps is probably correct. Mtoni is a considerable village at the fork.

COAST.—Ras Kankadya.—About $1\frac{1}{2}$ miles north-eastward of the entrance to Dar-es-Salaam harbour is the bay of Upanga, a sandy inlet with clifffy points, half a mile wide, and which dries at low water. A stream of the same name runs into the bay. At $1\frac{1}{2}$ miles northward of Upanga is another sandy bay forming one side of the neck of the promontory of Ras Kankadya; a rocky coast thence trends northward for about 2 miles to Ras Kankadya. This promontory, which projects northward nearly two miles, appears from the north-eastward like an island, and a sand patch in a cove is remarkable when the sun is in the east.*

Bongoyo is a long, narrow, rocky island, facing Msasani bay, and protecting it from the swell. It is $1\frac{1}{2}$ miles in length, with an average breadth of 2 cables, and presents a uniform outline of stunted trees on low cliffs 40 feet in height. There is a small isolated rock 8 feet above high water, off the north point, and a sandy bay in the centre of the seaward shore shows very white and conspicuous with the morning sun. The island is uninhabited and all but impenetrable.

The surrounding reef, dry at low water, extends seaward more than half a mile from the island, not very steep-to, but the sea always breaks. On the western side the reef dries nowhere more than one cable off, but the 3-fathoms line of soundings extends 3 cables distant from the island. A detached rock with 6 feet water, on which the sea does not always break, lies 6 cables S.E. by E. $\frac{3}{4}$ E. from the south point of Bongoyo island.

The soundings eastward of Bongoyo island and its reef are irregular, but there are no dangerous shoals. Kankadya patch, with 5-fathoms east water, lies with Ras Kankadya bearing West, distant $2\frac{3}{4}$ miles.

MSASANI BAY is formed by the rocky promontory of Kankadya; it is sandy throughout, intersected by creeks leading from mangrove swamps, and backed at a distance of 3 miles by a long featureless hill, rising to Gunja peak, a slight summit 600 feet in height. The bay affords good anchorage during either monsoon, and is safe and easy to enter from the southward. The south and west sides of the bay are, however, shallow, the sand drying in some places 6 cables from the shore, and the 3-fathoms line of soundings

*See Admiralty plan of Dar-es-Salaam and adjoining anchorages, No. 674.

being in other parts nearly $1\frac{1}{2}$ miles from high water line. From the village of Msasani, at the head of the bay, the shore trends northward for 6 miles to the village of Konduchi.

Anchorage.—In the north-east monsoon the best berth is in 8 fathoms, sand, with the north-west extreme of Bongoyo island, bearing North, and Ras Kankadya E. $\frac{1}{2}$ S.

During the south-west monsoon a berth more to the northward, off the north-west point of Bongoyo island, or in the head of the bay westward of Kankadya point would be preferable. From the latter berth, landing is easy at the village of Msasani, in the angle of the bay, which is 2 hours walk to Dar-es-Salaam.

Directions.—To enter Msasani bay, bring Gunja peak midway between Ras Kankadya and Bongoyo island, and steer in on that line till Ras Kankadya shuts in inner Makatumbe island; then alter course for Pangavini islet, borrowing a little towards Bongoyo to avoid the tail of the 3-fathom coast bank, if proceeding to the northern part of the bay. If intending to anchor under Ras Kankadya, round the point as convenient.

MBUDYA, the northernmost of the chain of off-lying islands mentioned in page 334, is a coral island of the usual character, faced with low cliffs, and standing on a ledge of coral. It is three-quarters of a mile long, of a triangular form, and is remarkable by a square clump of taller trees 60 feet high, which stand up conspicuous amongst the other foliage. The surrounding reef is 2 miles in length, one mile in breadth, and dries at low water, the greater part of it being to seaward of the island. The inner is tolerably steep, but the outer or eastern side deepens gradually, has outlying patches, and is dangerous to approach too closely. Mbudya spit, with 3 fathoms least water, lies with the south point of the island bearing N.W. $\frac{1}{2}$ N. distant 2 miles. A patch half a mile in length, and $2\frac{3}{4}$ fathoms least water, lies half a mile eastward of the spit. Fishermen occasionally camp on the island.

Anchorage.—There is a clear channel with 9 and 10 fathoms, more than half a mile wide, between Mbudya island and Fungu Mkadya; the centre of Pangavini bearing S. $\frac{3}{4}$ W. leads through. Good anchorage will be found under the lee of Mbudya island during the south-west monsoon period, in 11 fathoms, sand, with the small sand spit on the west point of Mbudya island bearing S.E. distant half a mile, and Pangavini islet S. $\frac{3}{4}$ W.

Mbudya patches are a number of little patches which lie at various distances outside Mbudya island, the outer one known being

4 miles from the island. They have from $3\frac{1}{2}$ to 5 fathoms water, but their neighbourhood should be avoided, as it is possible shoaler places may exist.

Pangavini islet, at one mile south-westward of Mbudya island is a rocky islet, on a coral bank three-quarters of a mile in length. The islet is one mile from the main, with a narrow but deep channel between.

At three-quarters of a mile northward of Pangavini islet, and the same distance west of Mbudya island, is a 3-fathoms patch of about 3 cables in extent.

Fungu Mkadya is a coral reef, $1\frac{1}{2}$ miles in length, dry at low water. From the depth of $2\frac{1}{2}$ fathoms off its south end, the north-east extreme of Mbudya island bears S.E. by E. $\frac{3}{4}$ E., distant one mile.

KONDUCHI HARBOUR.—The village of Konduchi stands on the beach of the mainland, opposite Mbudya island, near the mouth of Peremji river. The coast forms a rounded point, conspicuous from the northward, the more so as the trees about Konduchi are higher than others in the neighbourhood. The sand dries off for half a mile.*

Konduchi harbour is the name given to the anchorage south-westward of Mbudya island, and is a convenient shelter during the north-east monsoon for a vessel wishing to find a quiet place for the night. The best position is in 10 fathoms, sand, midway between Mbudya island and Pangavini islet.

Directions.—Konduchi harbour may be entered either from the northward or from the southward. The northern channel is narrow for a vessel of 18 feet draught, and no good leading marks can be given to clear the 3-fathoms bank northward of Pangavini; the centre of that island bearing S. $\frac{3}{4}$ W. should lead in mid-channel. For a smaller vessel it is only necessary to give the west point of Mbudya island, berth of 4 cables. The northern edge of Mbudya reef, though not steep, generally shows, and can be cleared by the eye.

To enter from the southward steer in with the north point of Bongoyo island bearing W. by N. until Pangavini islet bears N.W. by W. $\frac{1}{2}$ W.; when steer for it until the west extreme of Mbudya bears N. $\frac{3}{4}$ W., thence about N.W. by N. to the anchorage.

FUNGU YASIN is a coral reef, $1\frac{1}{2}$ miles in length, and one mile in breadth. It dries over a large area at springs, and has a sandhead on its north-west extreme, 4 feet above high water. From

* See plan of Dar-es-Salaam and adjacent anchorages, No. 674.

this head the trees at Bueni village bear W.N.W. distant 5 miles, and Mbudya island S. by E. $3\frac{1}{4}$ miles. On the western side the reef is steep-to, but at the south-eastern end shallow water extends off to a 3-fathoms patch, 2 miles S.E. $\frac{1}{4}$ E. from the sand head. South-eastward of this patch are the Mbudya patches already mentioned.*

Anchorage.—There is good anchorage inside Fungu Yasin during either monsoon, in 16 fathoms, off the centre of the reef, with the sandhead bearing N.E. distant half a mile. The safest approach to the anchorage is round the north end of the reef.

COAST.—From Konduchi village the coast trends north-westward with some sinuosities for about 16 miles to Waso, thence westward for $3\frac{1}{2}$ miles to Ras Luale. It is a low sandy beach, bordered by coral ledges and banks, backed by mangrove swamps or dense bush. A few miles inland are low rounded wooded hills, which in the vicinity of Konduchi rise to the height of 500 feet. From Konduchi village the coast is sandy for a short distance, and then rocky to Ras Kiromoni, a distance of $2\frac{3}{4}$ miles; the latter point is low, and forms a small bay on its west side, where there is fair landing in the south-west monsoon period.

At $4\frac{1}{2}$ miles beyond Ras Kiromoni is the village of Bueni, conspicuous by some white tombs and large mangoe trees; the coast here projects slightly in a rounded sandy point with a cliff. There are several villages on the beach between Kiromoni and Bueni. Along this coast the sand or coral dries for nearly half a mile off, with many outlying dangers.

Ukatani reef, $1\frac{1}{2}$ miles off Ukatani village, is small, and awash at low water springs.

From it Fungi Yasin sandhead bears E. by S., distant $2\frac{1}{2}$ miles. There is another small patch between this and Ras Kiromoni.

Bueni reefs lie off the village of Bueni, and are two in number. The northern one is a bank half a mile in extent, with a rock having a depth of 6 feet, from which Bueni village bears S.W. by W. $\frac{1}{4}$ W. distant $1\frac{3}{4}$ miles.

The other, at one mile south-eastward, has 2 fathoms water. These dangers are both difficult to see, as the sea seldom breaks, and the water is thick.

Kitapumbe reefs lie off the village of the same name; they are two in number, and of coral.

The south-easternmost, $2\frac{1}{2}$ miles from the land, and $3\frac{1}{2}$ miles north-

* See Admiralty chart:—Pangani to Ras Kimbiji, No. 640a; also Chart No. 664.

ward of Bueni village, is about one mile in length, and dries in one place 2 feet at springs. The other is one mile in diameter, 2 miles from the coast, and dries 4 feet. It lies with the right extreme of the land bearing N.W. by W. distant 5 miles. These dangers are fairly steep-to, and the sea generally breaks. The water is thick in this vicinity.

Mshingwi is a small coral reef, on which the sea always breaks when covered, lying off the centre of the sand spit forming Mwangotini lagoon. It is one mile from the land, steep-to, dries 11 feet at springs, and has 9 fathoms around it. From the reef Ras Luale bears about W. $\frac{1}{2}$ S., distant $2\frac{1}{2}$ miles.

Anchorage.—There is fair anchorage in 9 fathoms, mud, inside Mshingwi reef, particularly in the south-west monsoon. The shore is steep, and can be approached to a prudent distance.

Mwangotini lagoon is 4 miles long in a south-east direction, by one mile wide. It is formed by a long narrow tongue of coral and sand about $1\frac{1}{2}$ cables in breadth, which extends from abreast Waso in a north-westerly direction, parallel to the coast. This tongue is covered with thick bush, and ends in Ras Luale, a low point, the east point of entrance to the lagoon ; Ras Mbegani, the western point of entrance is also a low mangrove point, and distant one mile from it.

The lagoon is mostly dry at low water, but there are narrow channels leading to villages on the banks. Mbegani village stands on the beach a little inside the point of that name. Mwangotini is a large village on a steep bank about midway on the south side. Tall cocoa-nut trees and white tombs mark its position. The lagoon ends in mangrove swamps.

Coast.—From Ras Mbegani, the coast forms a slight sandy bay for 5 miles north-westward to Ras Nunge, a mangrove point which shows well out from the land, with Kaole and Bagamoyo lying between ; Kingani river entrance is 3 miles westward of Nunge, the coast between being a mass of mangroves.

Kebandahodi is a large sand and mud bank nearly awash at low water springs, abreast the village of Kaole, and fronting the entrance to Mwangotini lagoon. Its north extreme lies with Kaole red cliffs bearing S.W. by S. distant 3 miles, and is tolerably steep. The sea generally breaks here, but if it does not, the bank cannot be made out, as the water is thick and muddy. There is a narrow boat channel between it and the coast.

Kaole, a small village 2 miles south-eastward of Bagamoyo, almost

hidden from seaward by trees, stands a little eastward of the conspicuous red cliffs which are about $1\frac{1}{2}$ miles south-eastward of Bagamoyo. The custom-house for Bagamoyo is at Kaole, and the governor, is the chief in authority on this part of the coast, and superior to the Jemadar stationed in Bagamoyo.

Mbwakuni is a reef nearly 2 miles long and three-quarters of a mile wide, lying N.E. by E. distant 6 miles from Bagamoyo, and directly in the track from Zanzibar anchorage. It is all dry at low water springs, with 9 fathoms close to; many coral heads are visible at half tide, and on the western end is a large sand bank which dries 11 feet, and consequently nearly always shows, and the sea usually breaks on it, when covered. From this sand-head the French Mission houses at Bagamoyo bear S.W. by W. $\frac{1}{4}$ W., distant $6\frac{1}{2}$ miles.

Vessels should always pass westward of Mbwakuni reef, as the sand-head above mentioned can be rounded within 2 cables.

Currents.—The currents off this part of the coast are variable, and depend much on the direction and strength of the wind. In the south-west monsoon the current runs strong to north-westward past Mbwakuni reef, but inside that reef it is not so strong. In the north-east monsoon, when the wind is fresh, it is only on the flood that there is any set northward, but at this season the stream is variable.

BAGAMOYO.—The town of Bagamoyo stands a few feet above the sea level, on a low but steep bank of a sandy bay. It is the most important town on this part of the coast of Africa for hundreds of miles, but is a collection of wretchedly-built dirty huts and hovels, with a few white stone houses belonging to the richer Banians and Arabs. Its population is about 3,000, but as it is the point of departure and arrival for all central African caravans, this number must be frequently doubled and trebled at the seasons when the trade is at its highest. All carrying is done by porters, mostly Wanyamwezi, the tribe inhabiting the Arab settlement of Unyanyembe, 350 miles from the sea coast. These inland negroes are easily distinguished from the Washenzi and other coast men by their long frizzy ringlets of wool, and the ivory amulets which most of them wear.

The Arab governor has a small guard of Baloch soldiers to keep the peace, and enable him to administer justice (*see* Kaole, on same page). The British subjects, the Banians and Hindis, as might be expected in such a centre of trade, are numerous. There is a bazaar where beads,

wire, cloths, and other objects prized by the African negro are sold.

A branch establishment of the Roman Catholic Mission at Zanzibar stands on the north side of the town. There were (1874) here two pères, four frères, and six sœurs in charge of some 300 negro children of both sexes. They cultivate a considerable area of ground, and teach practical agriculture and useful trades, such as carpenter's and smith's.

Landing.—At low water, the sand covering a coral ledge, dries nearly a mile from the Bagamoyo shore, on which the dhows are grounded near the beach, and unload when the bank is dry. The best landing with any wind is off the north end of the town, nearly abreast the French Mission. Here, at low water, a coral ridge which trends parallel to the beach, forms, by its abrupt termination in the sand bank under the town, a little cove where the water is generally smoother than elsewhere. At high water, the same ridge, though covered, breaks the swell.

Anchorage.—The water shoals gradually to the shore, and renders it advisable to anchor at some distance off, as the swell sets heavily in with either monsoon, and makes a berth in shallow water an uncomfortable one. A good berth for a small craft, is in 4 fathoms, $1\frac{3}{4}$ miles from the landing-place, with Ras Nunge bearing W. by N. $\frac{1}{2}$ N., and the conspicuous red cliffs to southward of the town S. $\frac{3}{4}$ E.

A better berth, farther out, in about 5 fathoms will be found with the west extreme of Mbwakuni reef E.N.E., and the conspicuous tree on Ras Windi N. by W.

Directions.—Kebandahodi bank is the only danger to navigation in the vicinity of Bagamoyo, and vessels have frequently touched on it. The Arab governor's house, which is white and conspicuous,* near the beach, and visible from 10 to 12 miles on a clear day, when bearing S.W. $\frac{3}{4}$ S. leads one mile westward of Mbwakuni reef, and three-quarters of a mile westward of Kebandahodi bank. But should a vessel pass east and southward of Mbwakuni reef, as the native craft do, and as a native pilot would probably wish, she must preserve a westerly course, and not increase her distance to more than one mile from Mbwakuni, until the Arab Governor's house bears southward of S.W., when she may make straight for the anchorage.

To cross to Bagamoyo from Zanzibar, proceed out through the Southern pass (page 370), and steer to the south-west until the

* Possibly destroyed by the recent bombardment, 1888.

south point of Chumbe island comes in line with Hatajwa hill. This mark astern will carry a vessel between Tambare and Boribu reefs and northward of Mbwakuni reef, which latter should be seen, on a bright day from the masthead, as soon as Boribu reef is passed; when seen, steer to pass about half a mile northward of it, thence direct to the anchorage.

To make the passage in the opposite direction, it is better, especially in the south-west monsoon when the currents are strong, to steer out from Bagamoyo for Mbawakuni reef until within $1\frac{1}{2}$ miles of it, then alter course to the eastward, and pass southward both of that reef and of Boribu reef, keeping a good look out for the latter, and giving it a wide berth; Hatajwa hill bearing E. by N. $\frac{3}{4}$ N. leads $1\frac{1}{2}$ miles southward of Boribu, and midway between it and Ariadne reef. But if the weather be clear a vessel may pass northward of Mbawakuni and Boribu reefs, on the leading mark, Hatajwa hill in line with south point of Chumbe.

Caution.—At times, such as high water, sun ahead of the vessel, calm weather with mirage, shadows of clouds on the water, or such like, it will be dangerous to trust to the eye, and bearings of objects alone must be depended on.

KINGANI RIVER.—The Kingani or Ruvu, is the most important river on the coast adjacent to Zanzibar island. Its source and course are somewhat disputed, but there is no doubt that it receives most of the drainage of a large tract of country. It could be made practically useful as a means of transport for about 50 miles, and when the river is moderately high, even more. It has many names, of which Kingani is applied to the lower portion only; 15 miles up it is known as the Ruvu, but on the coast the former name is better known. Its mouth is in lat. $6^{\circ} 23'$ S., long. $38^{\circ} 52'$ E.

Bar.—Kingani river is fronted by a shifting bar variable in depth, which dries about 2 miles from the shore, with a semicircular outside edge, and the sea generally breaks heavily. A narrow channel was said to exist in 1874 from the northern side of the mouth by which a dhow could pass over the bar at low water, but it was not discovered by the *Shearwater's* boats.

The best passage in either monsoon is along the southern shore of the entrance, and inside a small mangrove islet off the south point of the mouth. This passage is only available, however, after three-quarters flood, when about 5 feet water will be carried in, the smoothness of the water makes it the most comfortable and

safest passage. It is somewhat deeper farther off shore, but innumerable snags render an outside route unsafe.

Along the northern shore is also a good channel to pass the bar when the sea is tolerably smooth, there being fewer obstructions than in the centre. After one hour's ebb a heavily laden boat should not attempt to pass either in or out.

The actual entrance is 6 cables broad from mangrove to mangrove, and 2 fathoms water is obtained immediately inside. At half a mile inside is the ferry of Windi, over which was the old land route of the slave caravans. The river is winding, with a general south-west direction, and an average breadth of 100 yards for 12 miles, at which point the mouth is only 5 miles distant in a straight line. Up to this point it runs mostly through dense mangroves, though a few pieces of bare prairie are passed, inundated during rains, but here the open country begins, with a flat grass plain on the right bank which extends back from the river 2 miles, to the edge of a low but steep-faced plateau.

In this locality cultivation begins; muhindi (maize), muhogo (manioc), mtama (millet), and viazi (sweet potatoes), are the principal cereals and roots grown, together with cocoa-nuts and plantains. At 19 miles from the entrance (7 miles as the crow flies) is Kingwere ferry, the route by which all trade to Central Africa passes from Bagamoyo. The river is here but 40 yards wide. At 2 miles above Kingwere cultivation ceases, and the river flows through forest, but the land is flat, the banks are steep, and about 8 feet high. The stream narrows to 25 yards, and becomes somewhat dangerous with snags and sand-banks. A little farther on, a large feeder, the Kangeni stream, runs into it from the westward. At 10 miles above Kingwere the river meets the edge of the plateau before mentioned, and a steep cliff of about 40 feet high forms the right bank. Somewhere between this and Kingwere is the highest point that the tides reach.

The traveller is now in the district of Dunga, of the Wazeramo tribe, and for 5 miles the river runs at a short distance from the steep edge of the plateau, now touching it, and now sweeping away with bold bends, till the small village of Dunga standing on the hill on the right bank, is reached.

This was the farthest point attained by the *Shearwater*'s boats, and is about 35 miles from the entrance by water, but only 15 in a straight line. The river here is about 18 yards wide and 6 feet deep, and the best information obtainable seems to intimate that it maintains this size for many miles.

On the left bank a broad plain stretches to the foot of low

undulating hills; and 8 miles from the river, giraffe, zebra, buffalo, hartbeest (a species of antelope), and other large game, are found in abundance, especially in the dry season, when they come to the neighbourhood of the rivers to drink.

The Kingani, like other rivers of this coast, is unhealthy, and is indeed considered unusually so. Fever generally follows any sojourn on its banks, and sleeping in boats seems to afford no immunity.

COAST.—From the mouth of Kingani river to Ras Windi, a distance of 9 miles, the coast trends northward, upon which are two or three hamlets known by clumps of cocoa-nut trees, and is a mere strip of sand backed by mangrove swamps. There is a break in the sand 2 miles southward of Ras Windi, through which the tide ebbs and flows, and during the rainy season the superfluous water from the inundated plain escapes.

Windi, a village containing about 1,000 inhabitants, stands a little within the strip of sand, which hides the huts at low water, and being on very low ground, must be unhealthy. A large baobab tree with some white tombs under it points out from the sea the position of the village.

Ras Windi, a small projection of sand, will be known by a large conspicuous solitary tree standing a short distance back from the point. It is fronted at the distance of one mile by a coral ledge, dry 6 feet at low water springs, on which the sea breaks heavily, with shallow water beyond it.

Fungu Miko is composed of two small reefs: the northern one, a head of broken coral, dries 8 feet, and lies with the conspicuous tree on Ras Windi bearing N.W. by W. $\frac{1}{2}$ W. distant 6 miles. The southern reef, half a mile south-south-east, is larger, and dries 6 feet. There are depths of 12 fathoms water close to both these reefs; the sea generally breaks.

Windi patches, on which the sea generally breaks, are two coral reefs dry at low water springs. The southern one, 3 cables in diameter, dries 6 feet, is steep-to, with depths of 8 fathoms around; it lies with the conspicuous tree on Ras Windi bearing W. by N. $\frac{3}{4}$ N. distant 4 miles. The northern reef, one mile N.E. by N. of the southern, dries 4 feet, with 12 fathoms around it.

Ras Utondwe lies $3\frac{1}{2}$ miles northward of Ras Windi. It is a low sandy spit, projecting considerably from the line of coast, and forming a small bay north of it, at the head of which is a salt-water creek having every appearance of a river, and named Mto Utondwe; the creek, however, ends in mangrove swamps $2\frac{1}{2}$ miles from its

mouth, and has no fresh water. It was probably at one time in connexion with the Wami, as the intervening country is one vast mangrove swamp, and entirely inundated during the rains.

Wami patches are eight separate coral patches lying 6 miles north-east by east of Ras Utondwe.* They are very small, varying in depth from 6 feet to awash at low water springs, and occupy a space over 2 miles in a north-west and south-east direction, by one mile in breadth. They are steep-to, having depths of 12 fathoms water around them, and dangerous, as the mud from the Wami and other rivers thickens the water at times to such a degree that at high tide they are invisible. The southern extremity of the flat Udoe hill bearing W. $\frac{1}{2}$ N. will lead nearly two miles southward of these reefs.

Tides.—It is high water in the vicinity of the Wami patches, at full and change, at 4h. 15m.; springs rise 15 feet, neaps 10 feet.

MTO WAMI.—The southern mouth of this river is 2 miles northward of Ras Utondwe, and is named Chunango; the northern entrance, one mile farther on, is the Purahanya. Both are difficult to make out, the coast being fringed with mangroves, and the rivers taking abrupt turns from the entrances. Of these mouths, the Purahanya is the principal, but both have bars which dry across at springs, and a boat will find difficulty in getting in after half-ebb. These bars, like others on the coast, shift and vary with the seasons.

Hippopotami and crocodiles are numerous in Wami river, and large game is said to be plentiful 10 miles from the coast. It seems to be a less deadly river than some others, as several parties from the *Shearwater* slept in their boats on it with no evil effects. Behind the low lands of this part of the coast, Udoe hill, a flat range about 800 feet in height, slopes sharply on its south side, and forms the northern limit of a broad valley, down which the Wami probably flows.

The country is inhabited by the tribe of the Wadœ. Off the mouth of the Wami shoal water extends a long distance, the 5-fathoms line being $3\frac{1}{2}$ miles off.

The Chunango branch, at 3 miles within the entrance, comes to an abrupt termination, and is completely dry at low water; a little below this point, a narrow and tortuous channel, also dry at low water, leads to the principal branch.

The Purahanya branch, inside its bar, is about 80 yards wide, and 12 feet deep at low water springs, with mangroves on either side. At three-quarters of a mile within the entrance, on the right bank, is a

* See Sheet No. 640 b.

piece of rising ground faced by a red cliff about 6 feet above high water. This is a good spot for camping, being never overflowed as the banks are in general. At 2 miles up, at the fork of the channel leading to the Chunango branch, the river at low water is only 20 yards across.

Above this it gets rapidly shallow, and snags and sand-banks fill the channel ; at low water a steam cutter cannot proceed more than a mile above the junction, and at a point $1\frac{1}{2}$ miles farther a whale boat will find it difficult to proceed. Here is another cliff on the left bank. Above this the river was not explored by the boats of the *Shearwater* in consequence of the lowness of the tides arresting further progress in the steam cutter, even at high water ; but Captain Malcolm, R.N., who went several miles beyond, states that the river slightly improves and deepens above, and that habitable land is reached at about 7 miles from the mouth, all below being dense mangrove and over-flowed lands.

The Purahanya mouth is difficult to find, but from seaward, the south fall of Udoe hill bearing W. $\frac{1}{2}$ S. will lead to it. Boats cruizing along the coast, from the northward, and wishing to enter the river, are recommended to sight the village of Saadani, which is of low mud huts, with one house somewhat higher than the others, close to the beach amongst the trees. The position of the village will be known by a peculiarly shaped hill to the southward of it, with dark trees on the top, which at a distance appears somewhat like a house. Having neared the village, follow the coast southward until the sandy beach ends ; here the shore is wooded to the water's edge, in the midst of which is the Purahanya mouth.

After passing the Purahanya, by proceeding to the southward past a sandy beach, for upwards of a mile, a wooded point is reached, close to which is the Chunanga mouth.

Mariner shoal.—A patch which dries in places about 3 feet at low water, half a mile in extent in a N.N.E. and S.S.W. direction, has been reported by H.M.S. *Mariner* to lie about 2 miles north-eastward of the Wami, with Saadani village bearing N. W. $\frac{1}{2}$ W. distant 4 miles.

Saadani.—The coast between the Wami and Ras Machuisi, a distance of 12 miles, is of the same character, low with a sandy beach, much mangrove about the mouths of the several rivers, and a sand flat drying out for half a mile.

Saadani is a large stockaded village 7 miles south-west of Ras Machuisi. It is the principal place between Pangani and Bagamoyo, but probably does not contain more than 2,000 inhabitants. There is

no shelter for the dhows that trade to Saadani, they are simply beached at high water. There are several smaller villages to the northward of Saadani, and many streams and swamps open into the sea at this part of the coast.

COAST.—**Ras Machuisi** is distinguished by a dense grove of trees higher than the surrounding vegetation, which show conspicuous from north or south, the point projects but little. A large village named Buiuni stands on the coast northward of it.

From Ras Machuisi the coast, with slight sinuosities, trends north-eastward for 31 miles to Pangani bay. A sandy beach skirts the shore the whole distance, and is used as the road connecting the villages which stand near the coast. At low water, coral ledges or sand-flats dry off for half a mile, which is again bordered by shallow water for some distance. The land immediately at the back is low, but at some distance off, it rises gently to the coast range of from 300 to 500 feet. Behind this again occasional higher land is seen. All is densely wooded. Numerous small streams fall into the sea, but only one of any considerable size.

On the coast between Ras Machuisi and Sange islet are several small villages, amongst which Mkwaja is the most important.

Northward of Ushongu village for about 4 miles, the coast is a sandy beach bordered by shallow water for some distance and backed by forest; thence rocky with low cliffs for about $2\frac{1}{2}$ miles to Ras Kikokwe, the south point of Pangani bay. At some distance inland are low flat hills, gently sloping to the sea plain.

Machuisi reef is about $1\frac{1}{4}$ miles in extent, and nearly awash at low water springs. Its outer part is 2 miles eastward of Ras Machuisi, to which it is all but joined at low water, there being only a 3-feet channel between. The 3-fathom coast bank extends one mile outside the edge of the reef.

Outlying dangers.—**Mwamba Buiuni** lies $3\frac{1}{2}$ miles from the coast on the edge of the 5-fathom line of soundings. It is of dead coral and dries 8 feet, with Ras Machuisi bearing S.W. by W. $\frac{1}{4}$ W., distant $4\frac{1}{2}$ miles.

Buiuni Mdogo is a small reef, with one fathom at low water, and steep-to, with 9 fathoms close around. It lies about $1\frac{3}{4}$ miles N.W. by N. of Mwamba Buiuni and 5 miles from the coast.

Mkwaja patches lie 3 miles northward of Buiuni Mdogo, and $4\frac{1}{2}$ miles S.E. by E. $\frac{1}{4}$ E. from Mkwaja village. They are of coral, four in number, steep-to, and lie within a diameter of half a mile,

in 12 fathoms water. They have an average depth of 6 feet at low water springs, and are dangerous on account of their small size, as the sea rarely breaks, and they are difficult to be seen.

Mwamba Alek, 3 miles north-eastward of Mkwaja patches, lies 5 miles S.E. by S. from Sange islet. It is small, with one fathom least water, steep-to with 20 fathoms close around. It generally shows white from the masthead, but the sea does not break.

Sange islet is small, rocky, 15 feet above high water, and stands on the coral ledge, within low-water line. It lies one-third of a mile off a low point $4\frac{1}{2}$ miles southward of Kipumbwe river, and is not very conspicuous.

Kipumbwe river, which debouches in a bight about $4\frac{1}{2}$ miles northward of Sange islet, is of a considerable width at the mouth, but rapidly narrows, and though natives state that it is navigable for a few days' journey, it cannot be large. It probably rises in Genda Genda mountain, which is seen up the gorge, through which the river passes the hills. Mangrove swamps line the mouth, and the bar dries completely across at low water. A large village of the same name stands on the northern bank of the entrance, and is the port whence communication is held with the tribe of the Wasaguha, who occupy the country inland. This is a good place for boats away cruizing to obtain fresh provisions.

Genda Genda, an isolated mountain, 17 miles inland from Kipumbwe, is conspicuous, and remarkable by its two sharp peaks, the southern one 2,300 feet, and the northern about 1,900 feet in height. This appears to be a volcanic mountain.

Kipumbwe reefs.—At a distance of $6\frac{1}{2}$ miles from the coast, and a little southward of the mouth of Kipumbwe river, is the south extreme of a cluster of reefs which extend northward to Funga Datcha, a distance of $7\frac{1}{2}$ miles. Another line of reefs, $2\frac{1}{2}$ miles from the coast, extends parallel to it. These reefs are of various sizes, with deep channels between them. Some dry a few feet, others never uncover, and all are covered at high water, but the sea on the outer reefs almost invariably breaks.

Boat channel.—There is a deep and navigable channel of an average breadth of 2 miles between the two lines of reefs, having smooth water even in a strong monsoon, but as no marks can be given the channel is not recommended. For boats beating to the southward against the south-west monsoon, this channel (the continuation of the one from the north) is invaluable. When about

midway between Kipumbwe river and Sange island, a boat should then stand over to the Zanzibar coast.

MAZIWI ISLAND, standing on the western edge of a circular coral reef, one mile in diameter, situated about 5 miles south-eastward of Pangani bay, is small, sandy, and covered with casuarina trees, which are visible from a distance of 15 miles. The reef dries 5 feet on its outer edge, where the sea always breaks heavily. Between Maziwi island and Mwamba Mawe northward of it is the best channel into Pangani bay. Maziwi island is the resort of fishermen, but there is no water. Turtle land at the season for laying their eggs, February to July.

Anchorage.—There is fair anchorage westward of Maziwi island during either monsoon, with more protection than will be found in Pangani bay. The water is deep, but care must be taken not to anchor too close, as the reef is very steep. A position in 15 fathoms, sand, with the north edge of the reef bearing N.E. by E. $\frac{1}{2}$ E., and Maziwi island E. $\frac{1}{2}$ S., will be found good in the south-west monsoon. A berth farther south, in 17 fathoms, sand, with Maziwi island bearing N.E. by E. $\frac{1}{2}$ E., is better during the north-east monsoon.

Mwamba Makome is a narrow coral reef three-quarters of a mile in length, awash at low water springs, lying about $1\frac{1}{4}$ miles S.W. by W. $\frac{1}{2}$ W. from Maziwi island. It does not always break, and is the only danger requiring more than ordinary caution when approaching the coast southward of Maziwi island, as at high water, with the sun ahead, it is difficult to make out.

Fungu Ushongu lies southward of Makome, with a deep channel one-third of a mile in breadth between. The reef is one mile in length, dries 2 feet at low water, and its outer edge is steep-to; on its western edge is a white sand-head covered only at high water springs, and then the sea always breaks.

At one mile S. by W. of Fungu Ushongu is a one-fathom bank of small extent; a narrow bank, with about one fathom least water, lies half a mile south-west of it.

Fungu Datcha, a coral reef, that always shows by breakers when not awash, lies one mile south-east of Fungu Ushongu, and $2\frac{1}{2}$ miles S. by W. from Maziwi island.

Mwamba Mawe, lying off Pangani bay, is a coral reef, a few heads of which dry 2 feet at low water springs. It is three-quarters of a mile in length, one-third of a mile across, and tolerably steep-to. From its southern end, Bweni bluff bears W. by N. $\frac{1}{2}$ N. distant

6 miles, and Maziwi island S. by W. $\frac{1}{2}$ W. westerly $3\frac{1}{2}$ miles. It generally breaks at half tide, and the water appears green when it does not.

At half a mile N.N.E. $\frac{1}{2}$ E. from Mwamba Mawe is Mawe Mdogo, a small patch with 2 fathoms water, on which the sea seldom breaks.

Briton shoal is situated about $1\frac{1}{2}$ miles northward of Mawe Mdogo, with the north point of Pangani bay bearing about W. $\frac{1}{2}$ S. distant $4\frac{1}{2}$ miles. It has 4 fathoms least water, and is steep-to, with 7 to 19 fathoms between it and Mawe Mdogo.

PANGANI BAY, on the west side of the north entrance of Zanzibar channel, is $1\frac{1}{4}$ miles deep and $2\frac{1}{2}$ miles wide, but so shallow that only small craft can anchor inside the line of the points; nevertheless, the anchorage just outside the bay is fairly protected from heavy seas by the outlying reefs, and Pemba and Zanzibar islands break the ocean swell. Both sides of the bay are rocky, and bordered with coral ledges, backed by cliffs of about 50 feet in height. The head of the bay is a straight sandy beach, which dries off from the south end three-quarters of a mile at springs.

Landing.—When the bar prevents access to the ordinary landing place in the river, there is good landing, particularly in the north-east monsoon, at the northern end of the beach, under the lee of a rocky point. The best time to land is at high water.

Anchorage.—The best anchorage off the bar is in 5 fathoms, sand and mud, with Bweni bluff bearing N.W. by W. $\frac{3}{4}$ W., the north end of the sand beach N. by W. $\frac{3}{4}$ W., and the extreme of land to the southward S.W. $\frac{3}{4}$ S.

Directions.—On approaching Pangani bay, Maziwi island is conspicuous. Inland, the coast ranges show a tolerably uniform elevation of about 200 feet, and behind them again rise the picturesque peaks of the Usambara mountains, many miles inland. Tongwe, an isolated, round, dome-shaped peak, 2,200 feet high, is seen to the southward of them, and nearer the coast. This peak must not be confounded with Genda Genda, 17 miles farther south, which has two separate sharp peaks. Inland of Pangani bay, a bare yellow patch on the steep face of the flat hill can be seen many miles when the sun shines on it from the eastward, and marks well the position of the bay.

In coming from the southward, Maziwi island should be kept bearing westward of North, passing half a mile eastward of Maziwi reef; when Bweni bluff is in line with Tongwe peak bearing N.W. $\frac{3}{4}$ W., steer for it; this mark will lead northward of Maziwi island and reef, and to the anchorage off Ras Kikokwe. Should

Tongwe peak be obscured (a frequent occurrence), the reef of Maziwi island is so plainly to be seen, that the eye can with safety navigate clear of its steep edge.

From the northward, Maziwi island may be steered for when bearing westward of S.W. by S., until Mbweni bluff bears northward of W.N.W., to avoid Mawe reef, when the bluff may be steered for.

For entering the bay southward of Maziwi island, no marks can be given, but it is safe and easy with the sun in a favourable position for seeing the reefs.

Tides.—It is high water in Pangani bay, full and change, at 4h. 15m.; springs rise 15 feet, and neaps 10 feet.

Mto Ruvu or Pangani river, one of the largest on this part of the coast, rises in Kilimanjaro, one of the highest of the east coast mountains, at about 120 miles from the sea. Like all African rivers, its depth varies with the season.

Bar.—The channel to the river is along the south shore. At Ras Muhesa the bar commences and extends seaward for three-quarters of a mile, varying in depth and probably position with the season, its southern limit being the coral ledge fronting the coast. The depth on the bar at low water springs (September 1873) for a short distance was but 3 feet. On the flood, and with a moderate wind, the water on the bar is usually smooth; but at the ebb, and especially at springs, it is often dangerous, and many accidents have occurred to boats unwarily crossing at this time. At the time of floods in the interior, (about June) the river runs into the sea with great velocity.

Within the bar, abreast the village of Pangani, the river is about 350 yards wide and 12 to 15 feet deep. The southern side of the entrance is marked by a perpendicular bluff named Bweni, about 200 feet high, and conspicuous from seaward. The northern side of entrance is the flat sandy beach that extends from the head of the bay.

The first 4 miles of ascent are through a dense mangrove swamp, which cover the flat between the hills on either side. The river then passes through higher land, and at about 6 miles from its mouth the mangrove swamp is passed, and a beautiful and fertile country reached. The banks here are all under cultivation, mostly sugar, a considerable quantity of which is made by Arab owners who use hand-mills, worked after the manner of a capstan by slaves.

At 10 miles from the mouth, the steam cutter of H.M.S. *Shearwater*, drawing 3 feet, was unable to advance until the tide rose, and shallows were frequent from that up as far as it is mapped.

In December, 1887, the steam cutter of the Imperial German ship *Nautilus* reached the village of Shogwe, 22 miles by river from Pangani, and about 12 miles direct, but there was only sufficient water in places between half flood and half ebb.

Smaller boats it is stated can reach within one day's journey of Korogwe, the principal station of the East African Company on the plains near the Usambara mountains. The river is highest about June and lowest in January. *See page 20, on rains.*

Crocodiles are numerous, but the hippopotami are getting scarcer in its lower parts, being driven back by European hunters to the shelter of the upper waters. The natives and Arabs do not seem to attack them, though they do much damage in the cane pieces.

Pangani village, on the left bank of the river at its entrance, lies very low, and bears a most unenviable reputation for fevers, &c., a fact easy to understand, as the sand on which it stands is but a strip, separating the sea from the extensive mangrove forest that grows up to the doors of the outlying huts. This strip of sand is covered with cocoa-nut trees. The village is a collection of wretched huts, and may contain 2,000 inhabitants. A small village, named Bweni, stands on the opposite bank of the river, under Bweni bluff.

Trade.—There is considerable trade with Zanzibar and Pemba, the dhows loading and unloading in the river. The produce is brought down the river principally on rafts made of the Moale palm, which rafts are then broken up, and become articles of commerce. Sugar and hides may be considered the principal exports. The stoppage of the sea slave traffic in 1874 created a land route, of which Pangani village is a stopping-place and market.

Water.—There are wells in the town, but the water is very bad, and boats' crews should avoid using it when possible.

NOTE.—The description of the coast of the mainland is continued at page 398.

ZANZIBAR ISLAND AND CHANNEL.

GENERAL REMARKS.*—Zanzibar Island, the head quarters of the Arab power on the east coast of Africa, is the largest and most important of the many coralline islands bordering the shore, and is the seat of most of the trade between this coast and the Arabian and Indian ports by sea as well as that with the central parts of Africa by land. The 6th parallel of south latitude runs through the island, which is 47 miles long in a north and south direction, and about 20 miles broad at its point of greatest width, which is from the town of Zanzibar on the west side to Chuaka head on the east.* The island, 440 feet high, is undulating, the ridges being generally disposed north and south, with plains between, which, in several instances, show the same coralline surface, worn into little points and ridges, as may be noticed on any part of the ledge round the island at low tide.

The island stands on a coral flat, the result of many years' action of the waves on the original steep though low cliffs, which doubtless edged the island when it was first raised from the sea by upheaval, and which, at high water, still in most places border it.

This flat, as might therefore be expected, is much broader on the seaward side of the island than on the inner and more protected side. Except at a few spots, and in the inlets, it is very steep-to, dries a foot or two at low water, with a rather higher outer edge than its average, but is otherwise level. All the small reefs of the adjacent channel and coast are of precisely the same character.†

* The information relative to Zanzibar island and channel is from Commander Wharton, H.M. surveying vessel *Shearwater*, 1874. The western shore of the channel, with its dangers, is described on pp. 344–358.

See Admiralty charts:—Pangani to Ras Kimbiji, including the approaches to Zanzibar, No. 640a, 640b : Zanzibar harbour and its approaches, with views, No. 665 ; scale, $m = 1\cdot5$ inches ; and Sheet X, No. 664.

† Some of these reefs still have islands on them, but a very short inspection of the latter will show that it is simply a question of time as to when they will be reduced to a broken coralline sandhead, which is the next stage of demolition, and in which state a majority of the reefs around Zanzibar are now in. The last stage, that of a flat coral reef, completely covered, except at low water springs, would seem to be the point at which change due to aqueous action ceases ; but this is not always reached, as the wash of the water from different points of the flat coral edge tends to prevent the sand from being carried away.

As an instance of change, may be cited Tree island, situated south-westward of Zanzibar town on the charts of the commencement of this century. At the time of Captain Owen's visit in 1822 this had disappeared, leaving two white sand heads always visible. In 1874 nothing remained on the reef (locally called Nyange) in the position of the island, though another sandhead on its northern or lee point, visible in Owen's time, is, as far as can be determined, in *statu quo*.

There are several curiously isolated rocky hills in Zanzibar island, which show, by their water-worn and undermined sides, that, during its upheaval, the island was once stationary at a lower level, and that the same water action was taking place.

On the other hand, coral reefs are growing up in many places, but the survey of Captain Owen was too rapidly executed to admit of any comparison of depths.

Parts of the island are most fertile; in some places the soil is sandy, but even here all tropical cereals and edible roots grow in extraordinary profusion. In 1872, when a fearful cyclone swept over the island, two of the main products and sources of trade were nearly destroyed; the groves of cloves, of which spice Zanzibar supplied the larger moiety to the English markets, were, with two or three exceptions, entirely levelled; and it is estimated that four-fifths of the cocoa nut trees that lay in the path of the storm were torn up. As there was an enormous annual export of nuts for the soap and oil trade, besides a large quantity of oil made in the island, the destruction of these trees was nearly as great a check to the prosperity of Zanzibar as that of the cloves.

Zanzibar island possesses several good anchorages on its western side, but that of Unguja, the principal town of Zanzibar (page 371), is the only one frequented by vessels engaged in ocean traffic. The eastern coast of the island is unindented, save by the large bight of Chuaka, but this is too shallow to be of any utility.

Zanzibar Channel.—The island is separated from the mainland by a curved channel that averages 20 miles in width, the shores of the main and the island being generally parallel. The narrowest part of the channel, from Ras Fumba to the shore near Ras Luale, is $16\frac{1}{2}$ miles; and its length from Ras Ndege (south entrance) to Pangani bay about 95 miles.

Zanzibar channel is thickly studded on either side with coral reefs, which narrow the available clear passage, at two places, to only 4 miles; but, except in those instances, an average distance of about 12 miles is left between the outlying dangers. On the island side the water is, generally speaking, clear, and the reefs are plainly seen, but towards the mainland there is much discolouration from the mud brought down by the rivers. The position of the sand-heads on the coral reef usually change with the monsoon.*

Trade.—As all the trade of the mainland accumulates at Zanzibar town, there is a considerable export. Ivory is brought in vast quantities from central Africa, and is the most important article of export; copal, the valuable fossilized gum, is dug on the opposite mainland, and comes next on the list; hides, orchilla, cloves, india-rubber, and millet being the principal of the remainder.

Imports comprise beads, wire, cloth, guns, powder, spirits, rice, and hardware, for traffic with the interior; coals, cereals, cottons, and other material for clothing, and miscellaneous goods.

* For directions from the southward, see pp. 364 and 370; from the westward, p. 374; and from the northward, pp. 383 and 377. Also tides, currents, lights, pp. 362-364.

In 1883, the value of the exports amounted to £1,300,000, and the imports to £900,000.

In 1885, 121 vessels of the aggregate tonnage of 92,975 tons entered the port, of these 61 were British.

Currency.—All sorts of coins are current, but accounts are generally kept in dollars. The gold coins are principally American. The silver most in use are rupees. Maria Theresa dollars are also in circulation. Indian pice are the only copper coins, and are most useful on the mainland in buying small supplies, &c., as the less civilized natives prefer them.

Government.—The Arab Seyd (Sultan) of Zanzibar claims dominion over the two neighbouring islands of Pemba and Mafia, over the mainland for 10 miles from the coast between cape Delgado and Formosa bay, and certain harbours near the equator, *see page 6*. His authority in the islands and in some of the larger towns on the coast is unquestioned, but in small places on the mainland, at any distance, the authority is lessened.

In all the large villages on the coast of the mainland there is a Jemadar, or headman, who represents the legal power in every form; sometimes he is an Arab, but generally a half-breed.

Population.—The Arabs number about 4,000, and own the best part of the cultivated land. Next in importance come the British subjects, the Banians and Hindis (natives of Cutch in India), who have been long established as the main traders of the east coast of Africa, and who do nearly all the shopkeeping in Zanzibar. They are present in every trading place on the coast, and possess most of the money.

In Zanzibar the Banians number nearly 1,000, and the Hindis about 3,000.

The rest of the population of the island is made up of negroes, slave and free, who form the working class. In 1886 it was roughly estimated at 200,000, of whom 80 to 100,000 are in and around the town itself, the remainder distributed among the plantations and villages of the country.

A few of the aborigines of Zanzibar (the Wahadimu) linger on the east coast near Chuaka, and still claim some slight independence of the Arabs.

Winds.—Seasons.—The south-west monsoon sets in about March, bringing the heaviest of the rains; this is called the Masika season. The monsoon blows strong for two months or more, rain being prevalent all the time. By July or August the wind settles down to a steady breeze, and the rain clears off. This lasts till October, when the south-west wind gets fitful and uncertain and rain and squalls again

may be expected. By the end of November the north-east wind sets in, sometimes quietly, sometimes with a burst, and, after an interval of a fortnight, blows steadily until February, when it begins to die away. These seasons, however, are so uncertain as to make it difficult to attempt any rule at all, and any such must be understood to be subject to great deviations. Squalls and occasional rainy days may be expected all the year round.

The monsoons near the land do not blow steadily in one direction. In the south-west season it is usual, especially in Zanzibar channel, for the wind in the morning to be from the west or south-west, freshening up to 10 a.m.; after that its strength diminishes a little, and hauling round to the south, freshens again about 1 p.m., finishing in the evening at south-east; when this takes place the weather is usually fine; but if the wind does not commence at west in the morning, and veers to the southward, there is more chance of rain than if it did so.

After the north-east monsoon is well established, the wind in the morning will be N.N.E. veering to E.N.E., at about 2 p.m.

Cyclones are unrecorded prior to 1872, but in April of that year one of these scourges swept over the island from the north-eastward, destroying all in its path. The southern end of the island was, however, untouched. See also pp. 16, 17 and 20.

Temperature and Climate.—July, August, and September, are the coolest months, the thermometer on board ship ranging by day from 77° to 81°, and by night it occasionally falls to 73°. During January, February, and March, the hottest months, the day range is from 83° to 90°, and at night the temperature rarely falls below 80°.

The climate has a bad reputation, but although there is undoubtedly much of a severe and sometimes fatal type of fever, its ordinary virulence and effects have been somewhat exaggerated. Europeans should, if possible, avoid being on shore at night until they are acclimatized, and especially so when they are in the vicinity of rivers.

The worst season for white people is from February to May, but the blacks seem to suffer more in July and August. See also p. 20.

Tides and Currents.—The tidal wave coming from the eastward makes the times of high water at full and change nearly identical for all this coast, only varying a little on either side of 4h. 10m. There is a great diversity between the neap and spring ranges, the latter being generally, in Zanzibar channel, 15 feet, and the former 5 feet. This makes a vast difference in the appearance of the reefs and shores of the mainland and island, and especially in the neighbourhood of Zanzibar town, where the united areas of coral

banks, covering and uncovering, amount to many square miles. This must be constantly borne in mind when navigating these waters, with or without charts, and it is hardly necessary to add that low water should, if possible, be chosen for passing through any passages new to the navigator.

The tidal streams, as a rule, are as follows: the flood runs southward in the northern part of Zanzibar channel, and in a contrary direction at the southern end, thus meeting at high water at a point near the centre, the position of which depends much upon the wind.

The ebb sets in the reverse way, namely, from the centre to the north and south points of the island.

It is high water in Zanzibar harbour, full and change, at 4h. 15m. Springs rise 15 feet, and neaps 10 feet. The direction of the streams is variable at the anchorage, as the tides meet near there. In the south-west monsoon off Ras Shangani the stream runs chiefly northward at all times of tide, but a vessel anchored under the lee of the point will be in the eddy, and will swing in all directions. During the season of the north-east monsoon the streams are not strong.

Off Bawi island and through the Great pass the direction of the set is always northward in the south-west monsoon.

In Zanzibar channel the current is variable.* In the south-west monsoon, in the clear channel, it runs continually to the northward; but amongst the reefs and islands the tidal streams affect it, particularly at springs.

In the north-east monsoon the tide is more felt, and at springs, in all small channels and harbours, overcomes the northerly set.

In attempting to foresee how a stream will run in any part of Zanzibar channel, the navigator must take into consideration the age of the moon with its resulting strength of tidal stream, the direction and force of the monsoon and the shape of the land, and then judge as best he can what the result will be.

Outside Zanzibar island, the current always sets to the northward. In the south-west monsoon its rate varies from $1\frac{1}{2}$ to 4 miles an hour; in the north-east season, from one to $2\frac{1}{2}$ miles. This current runs through the passage between Pemba and Zanzibar islands, and up Pemba channel with about the same velocity, see p. 397. It is a common thing for boats, when beating up in the south-west season, to start from the south point of Pemba island with a good breeze, stand over to the mainland, and fetch back to the north point of Pemba islands, 40 miles to leeward.

* H.M.S. *Undaunted*, at midnight on the 8th September 1877, hove to off Ras Kimbiji to allow for drift in the Zanzibar channel, but at daylight the ship was in the same position.

Lights and Buoys.—The approach from the northward only, is lighted, but the lights must not be relied on (page 381); the buoys will be found with the description of the shoals they mark, but no dependence must be placed in their maintaining the positions assigned to them.

GENERAL DIRECTIONS from the SOUTHWARD.—A vessel from the southward and eastward bound to Zanzibar during the south-west monsoon should endeavour to make Ras Mkumbi (Moresby point) the northern extremity of Mafia island, page 320, in preference to Ras Kizimkazi the southern point of Zanzibar island, in order to make sure of clearing Latham island, and that she may, if necessary, heave-to with safety. The northerly current, though generally strong, is so variable, that great caution is necessary.

Give Ras Mkumbi a berth of at least 3 miles, and alter course to the northward when it bears S. by W. Inside of this line the current is comparatively weak,* and the vessel can steer nearly straight for Ras Kimbiji (page 332), with the expectation of making not much to northward of her course. The coast about Ras Kimbiji is clear of dangers, and the land is the highest for some miles in the vicinity. To the north of Ras Kimbiji the current again strengthens as Zanzibar channel opens.

In the north-east monsoon a vessel should be guided by circumstances; the current is still continuous to the northward, and a sailing vessel had better pass outside Zanzibar island, and enter with a fair wind by the north channel. A steam vessel could either steer as above, or straight for Ras Kizimkazi.

Ras Kizimkazi, or the land at its back, will be sighted in clear weather at a distance of about 15 miles.† There is nothing remarkable in its appearance, which is that of a long, low, wooded hill. Steer so as to keep it on the starboard bow till Pungume island is seen. Ras Kizimkazi should be given a berth of about 4 miles, or the extreme of the point should not be brought eastward of E.N.E. until Pungume island bears N. by W., when a vessel may steer N.N.W. $\frac{1}{2}$ W. Hatajwa hill well open to the westward of Pungume island about N. by W. will lead westward of Pungume patches and Moore bank.

When this mark is open, steer to pass $1\frac{1}{2}$ miles westward of Pungume and Kwale islands, and follow the directions given at page 370.

COAST.—Ras Kizimkazi the southern point of Zanzibar island, is so rounded that the appearance of the land alters with every position of a vessel; the south-western portion of the point, however,

* See Currents, p. 363. † Lighthouse building.

which is generally made by a vessel, and where there is a small sandy bay with some tall cocoa-nut trees is conspicuous from some points of view. The point is cliffy, 15 feet high, backed by gently rising ground covered with dense bush, the tops of which are from 70 to 100 feet above the sea, and may be seen about 15 miles.*

The cliffs are undermined, and landing is impracticable on this part of the coast, from the sandy bay for a distance of 7 miles to the north-eastward, except at one spot on the south-eastern part of the point, where a gully in the cliffs affords an entrance.

The coral ledge dries off Ras Kizimkazi to a distance of three-quarters of a mile, having a steep edge, with 30 fathoms water a few yards from it. A sand bank on its edge dries 5 feet at low springs. On the edge of this coral the swell breaks heavily and always affords a capital guide to the eye, but a vessel gains nothing (unless coming from the northward, or making for Menai bay) by rounding Ras Kizimkazi closely.

About 4 miles eastward of the point, and one mile off shore, is Kizimkazi patch, three-quarters of a mile in diameter, with 6 fathoms least water, coral and sand; it may be used as a temporary anchorage when the monsoons are not strong.

Current.—The current sets north-westward round Ras Kizimkazi at all times, but is much stronger during flood, and especially during the south-west monsoon.

Peete inlet.—From Ras Kizimkazi the western coast, which is of alternate cliffs and sandy bays, trends to the entrance of Peete inlet, a distance of $5\frac{1}{2}$ miles. It is bordered by a coral bank, which dries off from 2 cables to one mile. Peete inlet, 6 miles long, and $1\frac{1}{2}$ miles wide, is nearly all dry at springs, except a narrow deep channel up its centre. The western side of the inlet is formed by the islands of Wundwi and Uzi. The head of the inlet is lost in mangrove swamps, through which there is a passage for canoes by some narrow channels northward of Uzi island into Menai bay.

Ras Bweni, the rocky south point of the little island of Wundwi, is the west point of Peete inlet.

MENAI BAY is a large sheet of water formed partly by the out-lying islands of Pungume and Kwale with their reefs, and partly by a deep indentation in the main island. It is about 12 miles long, and on an average $3\frac{1}{2}$ miles wide. The eastern shore of the bay from Ras Bweni is low, with small cliffs and sandy beaches, bordered by a coral ledge which dries off for half a mile. The head of the bay is lost in

* Light-house partly built, see page 381.

mangrove swamp, and is divided by a narrow island into two smaller bays named Kiwani and Kumbeni. The Mwera stream, one of the largest in Zanzibar island, falls into the bay, or, rather, loses itself in the mangrove swamp. The western side of the head of the bay is formed by the peninsula of Kumbeni, which projects from the base of Hatajwa hill, and is a flat, well cultivated tract of land of about 40 feet high.

Ras Yeketekambe and Fumba are the southern points of the peninsula; its west coast is low and faced by a coral reef to the distance of 3 cables. The chain of reefs and islands extending 8 miles to the southward of the peninsula, and terminating with Pungume island, protects the remainder of Menai bay from the westward.

Anchorage.—Good holding ground will be found any where in the outer parts of the bay, in from 12 to 15 fathoms, but, in the strength of the south-west monsoon, sheltered anchorage can only be obtained northward of Pungume island or between Niamembe and Miwi islands; or, for a small vessel, still higher up the bay, off the small islet of Sumi in about 6 fathoms. Here, however, the bay commences to be shallow, and the navigation is somewhat intricate; the eye and chart must therefore be the guide.

Hatajwa, a conspicuous isolated rounded hill, 206 feet high, stands on the flat ground of the main island, on Kumbeni peninsula, about a mile from the shore, abreast Ukombi islands. It is a mass of coralline rock rising from the level plain around, and the deeply caved worn sides and base give unmistakeable evidence of its having once stood as a solitary islet in the sea, undermined by the waves. There are other isolated hills in Zanzibar island of the same character.

OFF-LYING ISLETS AND REEFS.—Pungume island, situated $9\frac{1}{2}$ miles W.N.W. from Ras Kizimkazi, is the western point of entrance of Menai bay, and the first of the chain of small islands forming the east side of the channel to Zanzibar. The island is $1\frac{1}{2}$ miles long by half a mile wide, and stands on the south part of a large coral reef. It is of coral, with cliffs 10 feet in height, and densely covered with trees, the tops of which are about 40 feet above high water. On its eastern side is a sandy beach, off which, on the edge of the coral reef, is an islet that is conspicuous from the southward. There are two other islets on the fringing reef northward of the island; and a sand bank, which only covers at or near high water springs, lies on the northernmost point of the reef, one mile from Pungume island.

A ridge with 4 fathoms least water connects the sand bank with Kwale island. Pungume reef is not steep-to on its western side and though its edge generally shows by the sea breaking, it should be given a berth of 2 miles.

Pungume patches, westward of Ras Kizimkazi and south of Pungume island are several banks lying in the fairway of vessels bound to Zanzibar harbour, but only one, Moore bank, forms any impediment to navigation.

Bedford bank, the southernmost of the Pungume patches, is 2 miles in extent, with an average depth of 9 fathoms, and one small shoal of 5 fathoms. The bank is steep-to all round, with a sudden drop from 10 to 30 fathoms. From the shoalest part, the islet on the east side of Pungume bears N. by W. $\frac{3}{4}$ W. $6\frac{1}{2}$ miles.

Moore bank, lying about halfway between Bedford bank and Pungume island, is a smaller shoal, having a depth of 3 fathoms least water, and steep-to, the depth increasing rapidly from 4 fathoms to 18 fathoms outside the bank, and 12 fathoms eastward of it. Moore bank lies with the south end of Pungume island bearing N. by W. distant 3 miles.

Another large patch, with 3 fathoms least water, lies $2\frac{1}{2}$ miles E.N.E. of Moore bank.

Clearing marks.—The bottom will be plainly seen when near the Pungume patches, but a near approach is better avoided by heavy draught vessels. Hatajwa hill bearing N. by W. and open westward of Pungume island, or the island bearing eastward of N. $\frac{1}{2}$ E. will clear Moore bank, the westernmost danger; and the extreme of Ras Kizimkazi bearing northward of East will lead southward of it. In a vessel of heavy draught, the 5-fathom Bedford patch should be avoided.

Convenient night anchorage, especially during the north-east monsoon, will be found on these banks for small vessels.

Kwale island,* lying 3 miles north-westward of Pungume island, is low, rocky, scrub-covered island, the highest trees of which are about 30 feet above the sea, or rather lower than those of Pungume. The reef on which Kwale island lies is steep-to, uncovers at low water springs, and is always visible; it is steep-to on its west side, but shallow water extends some distance north and south of it.

The north end of Kwale reef, on which there is a sand cay, is separated from the coral ledge which dries for 2 miles southward of

* See plan of Zanzibar island and approaches, No. 665.

Ras Fumba, by a narrow channel 6 feet deep, much used by dhows, and useful for boats working along the shore.

Anchorage.—There is temporary anchorage between Pungume and Kwale islands in 8 fathoms water, with Pungume north islet bearing E. $\frac{1}{2}$ N., and the north-west point of Kwale island N.N.W.

Kipwa Gini, a small coral head, with 1½ fathoms water, lies W. $\frac{3}{4}$ N. distant 1¼ miles nearly from Kwale island. It is not easily seen, but Hatajwa hill bearing eastward of N. by E. $\frac{1}{2}$ E. leads westward of the shoal.

Mwamba Ukombi, two reefs nearly joined together, lie 1½ miles off Kumbeni peninsula, and extend parallel to the coast for a distance of 4½ miles ; they barely uncover at low water, springs, but are steep-to and easily seen from the masthead. Shallow patches extend off the ends of the reefs. The north-western part has three rocky islets on it. The northern islet is named Ukombi ; the other two are about 10 feet above high water, and named Tali.

Chumbe island is half a mile long, with overhanging low cliffs, and covered with trees 45 feet above the sea, similar to Kwale island.

Mwamba Chumbe, on which the island stands, extends nearly 2 miles in a south-easterly direction from the island, but on the western side not more than one cable off ; it is steep-to, discernible from aloft, and dries at low water springs.

Inner pass.—Between Kwale island and Mwamba Ukombi is an inshore passage running parallel to Kumbeni peninsula. In it the water is deep, and this passage and that between Chumbe and Ukombi reefs are much used by the dhows to avoid currents ; but as they can only be navigated by the eye, no directions can be given.

SOUTHERN PASS, the channel from seaward to Zanzibar town from the southward, may be said to begin abreast Chumbe island, up to which, the reefs bordering the coast of Zanzibar island, have already been described. The pass has a least depth in mid-channel of 5½ fathoms, and is available at all times for all classes of vessels ; but the best time is near low water, as most of the dangers are then visible. The coast, the reefs in the approach, and those bordering the pass, will now be described. The positions or colours of buoys in the approaches to Zanzibar must not be depended on. Directions, see p. 370.

Aspect.—The Coast from Ras Buyu, abreast Chumbe island, to Ras Shangani, on which stands the town of Zanzibar, is generally cliffy and broken with white sandy bays. Between Ras Chugwani

and Ras Mbweni it is low, then red cliffs, followed by white cliffs, from 50 to 70 feet high, to within one mile of Zanzibar town. The red cliffs near Ras Buyu are the most extensive and the highest, but they are not generally so conspicuous as those at Ras Mbweni, which, from their brighter colour, usually catch the eye first, the more so as a tall white house stands on them, forming another conspicuous object and distinguishing these cliffs. With the morning sun, however, it is difficult to make out any feature on this coast. The ground rises at the back and is covered with trees.

Ariadne bank is about 3 cables in length, with $2\frac{1}{2}$ fathoms least water, steep-to, and in the way of vessels bound in or out of the Southern pass. The bank can, however, be seen from aloft, and the channel between it and the southern part of Chumbe reef is $2\frac{1}{2}$ miles wide. It lies with the south end of Chumbe island bearing N. by E. $\frac{1}{2}$ E. distant $3\frac{1}{2}$ miles; and Hatajwa hill, in line with the northern part of Tali islet.

To pass either eastward or westward of the bank, keep the consulate at Zanzibar town well open on either side of Chumbe ; to pass northward or southward, keep Hatajwa hill open of the Tali islets.

With the sun to the south, and clear weather, the town shows white and conspicuous ; under other conditions it is not easy for a stranger to make out.

Boribu reef lies on the west side of the approach to Southern pass, and $5\frac{1}{2}$ miles westward of Ariadne bank ; it is 9 cables in length, and dries 3 feet at low water springs. On its northern point there is a small white sandhead, which covers at half flood.*

Tambare reef lies 2 miles north of Boribu reef ; it is an isolated coral reef one mile in length, steep-to, and can always be made out ; the sand-head on its northern extremity does not cover at high water neaps.

Outer Tambare, lying $1\frac{1}{2}$ miles westward of Tambare sand-head, is a coral patch with $1\frac{1}{2}$ fathoms least water, and always discernible.

Pwakuu reef, nearly 3 miles in length and $1\frac{1}{2}$ miles in breadth, lies $1\frac{3}{4}$ miles north-eastward of Tambare sandhead ; a large sand-bank on its western part is just covered at high water neaps, and the reef dries at different times of tide. A channel 5 cables wide, with a rocky patch midway, separates Pwakuu from Nyange reef.

Nyange reef, eastward of Pwakuu, is 3 miles in length

* The position of the sandheads on all these reefs usually change with the monsoon, shifting to the lee end of the reef.

$1\frac{1}{2}$ miles in breadth, and steep-to on its southern and eastern sides. A sandhead on the north extremity of the reef, barely covered at high water neaps, is generally to be seen ; the remainder of the reef dries 3 feet in places at low water springs.

It forms the western side of Southern pass, and will be sighted soon after passing Chumbe island.

Mtwana is a double-headed shoal lying off the Zanzibar coast from $1\frac{1}{2}$ to $1\frac{3}{4}$ miles westward of Ras Chugwani. The western head has $2\frac{1}{2}$ fathoms least water, and is marked by a black buoy with staff and triangle in 6 fathoms 2 cables westward of the shoalest spot. The eastern head has but 6 feet. Mtwana shoal is not easily seen, even at low water.

Kisiki reef lies one mile northward of Mtwana, and $1\frac{4}{5}$ of a mile westward of Ras Mbweni ; it is a coral patch just awash at low water springs, but a sand-bank on its north extreme dries 3 feet, and shows so white that the bank is generally to be seen at any time of tide. A shoal tongue extends southward from Kisiki reef, narrowing the available channel for heavy draught vessels at low water to about half a mile. There is a depth of 21 feet on the tongue, 5 cables southward of Kisiki sand-head.

A red mooring buoy in 5 fathoms marks the east extreme of Kisiki reef.

Pange, on the western side of Southern pass, is a coral reef, with a large sand-bank, which generally shows, and dries 13 feet at low water springs ; this part lies $1\frac{1}{2}$ miles north-north-westward of Kisiki reef. Pange is nearly joined to Kisiki by a shallow ridge, leaving a narrow but deep channel between. A one-fathom patch lies N. by E. $\frac{1}{2}$ E., about half a mile from Pange sand-bank.

DIRECTIONS.*—To proceed through the Southern pass ; having arrived abreast Pungume island, distant about 2 miles, and intending to pass eastward of Ariadne bank, steer N.W. by N., keeping the south extreme of Pungume eastward of S.E., until Hatajwa hill bears eastward of N. by E. $\frac{1}{2}$ E. to avoid Kipwa Gini, then steer N.N.W. $\frac{1}{2}$ W. so as to pass about three-quarters of a mile westward of Chumbe island. The outer houses of the town of Zanzibar (jail and consulate) should be kept well open eastward of Chumbe island, or the south end of the island bearing N. $\frac{1}{2}$ E., until Hatajwa hill is open northward of the two Tali islets, to clear Ariadne bank.

(To pass westward of Ariadne bank the west extreme of Chumbe

* For approaching, *see* directions, page 364.

island should bear eastward of N.N.E. with the outer houses of the town of Zanzibar well open westward of the island.)

From abreast Chumbe island steer about N. by W. and bring Masingini, a conspicuous square white tall house, with a dark high-pitched roof, standing on the highest summit of the ridge to the north of Zanzibar town, in line with a white pillar on the white cliffs to the south of the English Kiungani mission house, bearing N.E., which will lead through the middle of the deep channel in $5\frac{1}{2}$ fathoms water. The mission is a white three-storied square house on the low sea cliffs, $1\frac{1}{2}$ miles south of the town (*see* view C. on chart No. 665).

When Ras Buyu and Ras Fumba are in line bearing S.S.E. $\frac{1}{4}$ E., the vessel will be in deep water, and may steer for Ras Shangani, rounding it at the distance of 3 to 4 cables for the anchorage northward of it.

Caution.—As accidents have occurred to vessels proceeding through the passes for Zanzibar harbour at night, it is recommended unless in cases of necessity, to seek a safe anchorage outside until daylight. If compelled to go in, boats with lights should be sent ahead to mark the channel.

Anchorage.—The anchorage at Zanzibar is good anywhere off the town. Vessels of war generally lie in about 8 fathoms, mud, northward of the English Consulate, a large square house on the extreme point. During the south-west monsoon the smell of the town is most offensive and unhealthy, if the vessel be too close in, and a berth a little off shore is to be preferred.

During the north-east monsoon the landing is sometimes bad on the north shore of the town, and boats have to go to leeward. In this season it is better perhaps to anchor to the westward of Shangani point, that boats may land on either side, but the vessel in that case must anchor southward of the telegraph cables.

There is a mooring buoy in the northern anchorage, belonging to the Messageries Maritime Company.

Prohibited Anchorage.—Vessels are prohibited from anchoring off Ras Shangani within the space lying between the following marks, viz.: The northern black beacon on the cable house in line with the red beacon, bearing S. 76° E., and the clock tower open southward of the cable house, half the breadth of the latter (*see* the cables on the chart). In the Western pass, vessels must not anchor anywhere near the line of the leading mark.

ZANZIBAR TOWN, named Uguja by the natives, is principally built on low land which projects slightly from the island and terminates in a rounded sandy point named Shangani. Hence it is

conspicuous when entering from either northward or southward, as the houses are all of a dazzling white colour, and can be seen from a position 5 or 6 miles south of Chumbe island, and 10 miles to the north of Chapani island. The larger houses are built on the shore facing the north ; and the Sultan's palace, a tall square edifice, is conspicuous in the centre of the line, and has the Sultan's flag—red—flying on a staff in front of it. *See light, page 381.*

West of the palace, the low towers of the old fort are seen over a casemated water battery of 32 pounders, and on either side are the houses of the consuls and European merchants, the large square building on Shangani point being the British political agency and Consulate-general (formerly the Central African mission house). The town is, from this view, rather imposing, but these respectable buildings do but form a *façade* to the meaner habitations that compose the bulk of the town. The southern face of Shangani point presents a collection of wretched mud huts, and the interior of the town is a maze of narrow, tortuous, and filthy lanes, running between mud huts and dilapidated coral built houses.

To the south and east is a salt water inlet or lagoon, dry at low water, but which at high tide nearly converts the town into an island, and is only cut off from the sea to the south-westward by a low coral and sand ridge which extends from Shangani point to the south along the sea-shore. The lagoon is crossed by a stone bridge which connects the main town with its suburb on the eastern side. This quarter is, if possible, more foul and inodorous than the other, having the fish market in it. The entrance to the lagoon is one mile north-eastward of Shangani point. At this entrance and in the lower part of the lagoon all the old dhows, and dhows intending to make a long stay at Zanzibar, are laid up.

There are a few Portuguese shops for European goods, but the stalls in the native bazaars are mostly kept by Banians and Hindis, who do nearly the whole trade of the town.

Position.—The position of the British Consulate General and Agency, is lat. $6^{\circ} 9' 43''$ S., long. $39^{\circ} 11' 8''$ E.

Missions.—Zanzibar is the head-quarters of the English central African mission, which has establishments for young negroes of both sexes to the southward of the town. A church, with short spire, and school houses have been built on the site of the old slave market. A branch of this mission is established on the mainland to the north of Pangani.

There is also a Roman Catholic mission, presided over by French priests. They have a large blacksmith shop with a few hand

machines. There is a branch of this mission at Bagamoyo, on the mainland opposite.

Mails.—There is direct communication by mail steamer monthly to Aden ; direct monthly to Bombay ; and monthly to the Cape of Good Hope *via* the East African ports ; also monthly to Madagascar, Réunion, and Mauritius, by the Messageries Maritime Company, communicating with the French Australian line.

The exact date of the arrival and departure of the mail steamers varies according to the monsoon.

Letters leave England weekly for Zanzibar, but remain at Aden for the monthly mail, unless an opportunity occurs of sending them on by some other steamer, *see also* page 8.

Telegraph.—Zanzibar is in telegraphic communication with Aden, &c., and also with the Cape of Good Hope *via* Mozambique, Delagoa bay, and Natal. The positions of these cables are indicative by beacons, for which, *see* the prohibited anchorage, page 371.

The Telegraph establishment consists of a large telegraph house on Ras Shangani, south of the Consulate ; the station on Bawi island, p. 374, where the cables are landed, and a floating dépôt.

Trade ; Population ; Tides ; see pages 360—363.

Supplies.—There are some large tanks of pure rain water at Shangani point. Water from the town should not be used, the wells being impregnated with the drainage of the houses.

Fresh provisions are plentiful, but the fowls, eggs, beef, and mutton are inferior ; goats can always be procured, and fish abound. Fruit plentiful in its season, and the oranges and mangoes are particularly fine. There is an ample supply of all tropical vegetables.

There is also a naval dépôt of provisions on shore, for H.M. ships, and a contract for the supply of fresh provisions.

H.H. the Sultan has an engineering factory where very small repairs for H.M. ships and mail steamers may be effected. Repairs are usually effected at Bombay. Small craft can beach.

Coal may be taken on board at the rate of about 250 tons a day, of 24 hours, by means of native boats. About 2000 are kept in stock for H.M. vessels, and there is generally a stock of about 5000 tons for trading purposes, average price 45s.

Hospital.—There is a French Roman Catholic hospital at Zanzibar, with accommodation for 4 officers and 4 men, if required, and for which number arrangements have been made for H.M. ships, but it seems the patients would be better afloat, provided they can be kept under cover.

WESTERN PASS.—The Western pass into the anchorage of Zanzibar, is between the reef of Bawi island on the north, and Mapape and Murogo reefs on the south; thence between Fungu Chawamba bank and the 2-fathoms patches northward of it. The telegraph cables are laid in the Western pass, so vessels should avoid anchoring near them.

Bawi is a low island on the northern side of the entrance to the Western pass, covered with cocoa-nut trees, and, with its reefs, forms the western protection to Zanzibar anchorage. It lies 3 miles westward of the town on a reef which extends one mile south-westward of it and dries at low water, with several sand patches which dry from 6 to 8 feet. Northward of the island, a one-fathom ridge connects a patch named Mwamba Bawi, which dries at half tide; its south end is three-quarters of a mile in a N. by W. direction from Bawi island.

The sub-marine telegraph cables are landed at the cable house, on the south-west extreme of the island, for which, *see* the chart.

Fungu Mapape and Mwamba Mapape are two reefs lying on the south side of the entrance to Western pass, with a clear channel one mile wide between them and Murogo. They lie north and south of one another, and dry 6 and 4 feet respectively, at low water springs, with white sandheads. Together they are 2 miles in length, with a 4-fathom channel between them.

Murogo reef, about $1\frac{1}{2}$ miles in length north and south, lies between the Mapape reef and Pange, on the southern side of the pass, with a wide and deep channel on either side of it, which can be navigated by the eye with safety, all the reefs being steep-to. A large sand bank on Murogo reef generally shows, and dries 9 feet at low water springs.

Fungu Chawamba is $1\frac{1}{2}$ miles eastward of Murogo reef, and only uncovers at springs; it is steep-to, and generally to be seen.

Two-Fathoms banks.—About 4 cables northward of Fungu Chawamba, on the opposite or north side of Western Pass, is the nearest of two small banks, with $2\frac{1}{2}$ fathoms water on each of them, lying about 2 cables apart, and north and south of each other.

Directions.—Steer in about S.S.E. midway between Bawi and Mapape reefs, until Walleso house (in the trees) or the brow of the hill on which it is situated is in line with the jail bearing E. $\frac{1}{4}$ S. (*see* view B. on chart No. 665), which leads between Fungu Chawamba and the two-fathoms banks north of it. Walleso is a white house on the hill above the town, and is half hidden by trees. The gaol is a

square yellow house on the extremity of Shangani point, and is the next building southward of the Consulaté.

This channel can be navigated by the eye if the sun be astern of the vessel, but only when the sun is in the west can the leading mark be seen. *See anchorage, p. 371.*

NORTHERN APPROACHES TO ZANZIBAR TOWN.—The northern boundary of Zanzibar anchorage is formed by three islands with their reefs, extending in a westerly direction from the coast at Mtoni village; between these are three channels, viz.: English, French, and Great passes; the first named is the one commonly used.

Coast.—From Zanzibar town and lagoon the coast is low and sandy, and trends northward to Mtoni, a small village, with a large palace in ruins standing on the beach. This palace is used as a leading mark, but it is not so conspicuous as other white buildings on the shore; its position being next northward of a house with a box-like projection from its roof is the best way to identify it. Here an aqueduct, ending on the sea beach, conveys good water from a spring called Chim Chim, about a mile back from the coast. This aqueduct is, however, open, and as numerous negroes are generally washing either themselves or their clothes in it, the water is unfit for drinking purposes.

From Mtoni the coast to the north forms a slight bay to Bet-el Ras, a low rocky point on which stands a castellated white house with a portico, northward of which a depth of 3 fathoms will be found about 4 cables off shore. The land rises at the back of this part of the coast to a range of hills 440 feet high, which extend parallel to the shore at a distance of $1\frac{1}{2}$ miles, and is the highest land in Zanzibar island. This hill is crowned by a tall white house with dark high-pitched roof named Masingini.

From Bet-el Ras the coast trends northward with slight indentations, sandy bays, beaches, and low rocky cliffs, for 13 miles, to Ras Oswawembe, the north-western point of Zanzibar island. The land behind rises gently, is well cultivated, and covered with trees. The shore is generally steep-to, and may be approached to within a long half a mile, and it is better to close the shore to avoid the many out-lying reefs. At the village of Mungopani, $4\frac{1}{2}$ miles south of Ras Oswawembe, are two white pillars; Mungopani lighthouse is situated $2\frac{1}{2}$ miles northward of the pillars (*see light, page 381*).

Bububu is a palace at the mouth of a small river, one mile northward of Betel Ras. Here another aqueduct conveys water to the sea,

but the water is open to the same objections as that of Mtoni, namely, its use for washing purposes before it arrives at the shore.

ISLETS AND REEFS IN THE APPROACHES.*—Chapani is a low scrub-covered island, 800 yards in length, situated $1\frac{1}{4}$ miles from the coast of Zanzibar island—between them is English pass; unlike most others in this vicinity, the reef on which Chapani stands slopes gradually off in every direction, and has a number of small heads which crop up on the outer edge of the bank. Chapani island is used as a cemetery by the European community and by vessels visiting the port. From the northward, this island is not easy to make out, as it appears against the higher land of the main island.

Kebandiko is a small island to the north-westward of and on the same reef as Chapani island, the coral drying between them.

Chango is 20 feet high, 800 yards long, and situated three-quarters of a mile westward of Kebandiko. Shallow water extends southward which terminates in a knoll with 2 fathoms water, at $1\frac{1}{4}$ miles S. by W. from the island. North of the island rocky ground extends more than three-quarters of a mile with a rock awash near its termination; hence a tongue with $3\frac{1}{2}$ fathoms projects westward into Great pass.

Danzi reef, $1\frac{1}{2}$ miles north-westward of Chango island, is a small coral reef, awash at low water springs, with a one-fathom bank extending half a mile northward and 2 cables westward.

Shoal patches.—Between Danzi and Mwamba Bawi is another patch with $1\frac{1}{2}$ fathoms water, gradually deepening on all sides. Also, at 2 miles west of Danzi reef are a number of small patches, with 3 fathom least water.

Fawatu is a large reef lying N.N.W. $\frac{1}{2}$ W., distant 2 miles from Danzi reef, and 5 miles from the nearest part of Zanzibar island. It is upwards of 2 miles in length north and south, and dries in patches, but more especially at the north and south extremities. About 6 cables from the south end, of 3 fathoms, is a sandhead, which dries 9 feet at low water springs. This reef is easily seen, but must be approached with caution.

Yambwa Ngome reef.—At 2 miles northward of the northern dry part of Fawatu reef is the western Yambwa Ngome, a flat coral reef, awash at low water, with a small head which dries at half tide. It is steep-to all round, 4 cables in length north and south, and 2 cables in breadth.

* As far as relates to Admiralty chart, Zanzibar and its Approaches, No. 665.

Eastern Yambwa Ngome, a similar reef $1\frac{1}{2}$ miles distant, dries only at low water springs; it is somewhat larger than the other, and is 3 miles from the Zanzibar coast.

ENGLISH PASS, the entrance to Zanzibar harbour generally used by vessels approaching from the northward, is the name given to the narrow curved channel between Chapani island and the shallow water bordering the shore of Zanzibar. Though the east end of the island is more than a mile from the shore, the available channel is narrowed to a quarter of a mile wide by the shoals extending from both island and main.

Seagull shoal, less than half a cable in extent, lies directly in the approach to English pass; it consists of black sand and coral, with a least depth of $1\frac{1}{2}$ fathoms at springs over a coral head, and 4 fathoms close around; it lies with the large house on Bet-el Ras S.S.E. $\frac{1}{2}$ E., and white square castellated house north of Bet-el Ras E. $\frac{1}{4}$ N., distant $1\frac{1}{2}$ miles. It is sometimes buoyed.

The Clock tower at Zanzibar on with the west end of Chapani island leads a little eastward of the shoal.

Buoys.—The eastern end of Chapani reef terminates three-quarters of a mile eastward of the island by a steep fall from 2 to 8 fathoms water. This edge is marked by two red mooring buoys near each other, which can be rounded closely if in their proper positions, but as they are not securely moored nor well looked after, too much confidence should not be placed in them.

Directions.—To enter English pass eastward of Seagull shoal.—From abreast Mungopani,* and being three-quarters of a mile from it, and in not less than 6 fathoms water, steer along shore, avoiding the shallow water extending nearly half a mile off between Bububu and Bet-el Ras, by keeping the British Consulate only just open of the east point of Chapani, until Mtoni palace (in ruins and not very conspicuous) is in line with Walleso house, situated on the west end of the hills at the back of the town, bearing S.S.E. $\frac{1}{2}$ E., which mark leads through the middle of the pass; when the north extremes of Chapani and Chango islands are nearly in line, alter course to the south-westward and bring the white stone pillar on the beach in line with Kedichi (a square low dull looking house, which stands on the northern end of the hills to the eastward), bearing N.E. $\frac{1}{2}$ E., which mark will lead clear of Chapani reef and to the anchorage off Zanzibar.

* For directions northward of Mungopani, see page 383. Also, see Caution, p. 371.

To pass westward of Seagull shoal, steer for Kebandiko islet, bearing S. $\frac{1}{2}$ W., in line with the Consulate, until the leading mark, Mtoni palace bearing S.S.E. $\frac{1}{2}$ E., and in line with Walleso house and hill comes on, when proceed as before. This palace leading mark leads only $1\frac{1}{2}$ cables eastward of the 3-fathom patch, half a mile north-eastward of Chapani island. Two beacons, about 150 yards apart, formerly stood in front of Mtoni palace as a leading mark, but they appear to have fallen down and not been replaced. *See caution, page 371.*

French pass.—Between Chango and Kebandiko islands is a channel with $4\frac{1}{2}$ fathoms at low water springs, but it is very narrow; no satisfactory leading mark is to be found, and the distance in any case is shortened so little that the pass is not recommended. The eye and chart must be the guides if attempted.

Great pass, between Chango island and Danzi reefs, is the widest and deepest channel into Zanzibar harbour from the northward; but from its hidden and unbuoyed dangers it cannot be considered so good a passage as the English pass, as no leading marks can be given. With the sun in a favourable position and a fair wind, or under steam, Great pass would be safe to navigate from aloft.

ZANZIBAR CHANNEL, Northern Approach, Zanzibar shore.*—**Ras Oswawembe**, the north-west extreme of Zanzibar island, is a low cliffy point, forming the south side of the entrance to Kokotoni harbour. The western extremity of Ras Oswawembe is sand.

At $2\frac{1}{2}$ miles W. $\frac{1}{2}$ S. from Ras Oswawembe is a small bank with 5 fathoms least water.

From Ras Oswawembe the coast trends north-eastward for 13 miles to Ras Nungwe, the north point of Zanzibar island, sweeping round in a large bight, and forming the eastern side of Kokotoni harbour. Immediately eastward of Ras Oswawembe the coast forms a mangrove bay, named Mwanda, which is $1\frac{1}{2}$ miles deep, and about 2 miles wide. At the head of the bay the river Mzinga-Mzinga, the largest in the island, discharges itself from an extensive plain, which is mostly under water in the rainy season. Ras Mwanda, the eastern point of this bay, is also of mangrove. Mwanda village lies southward of the point.

From Ras Mwanda to Ras Nungwe the shore is sandy, with alternate low cliffs. Two small islets lie half a mile off the Zanzibar

* Description of coast continued from pp. 375—6. For west shore of the northern approach, *see* pp. 354—358. See Admiralty chart:—Pangani to Ras Kimbiji, northern portion, No. 640b. For Directions, *see* page 383.

coast, halfway between Gungodi hill and Ras Nungwe ; they are on the shore reef which here dries for $1\frac{3}{4}$ miles from the coast.

Water.—The Mto Kipanga falls into the sea at Ras Mwanda, and the water, which is good, never fails, coming from perennial springs a few miles inland. A boat can easily send her barricoes a few hundred yards up the bed of the stream to be filled. The mouth is concealed in mangroves, and is not easy to find.

Hills.—South-eastward about 4 miles from Ras Oswawembe, at the farther side of the Mzinga-Mzinga plain, are the Dongi hills, 330 feet high, and covered with cocoa-nut trees.

Kokotoni hill is an isolated rounded eminence 260 feet high separated from the Dongi hills by deep ravines, through one of which Kipangi river runs.

Northward of Kokotoni are several isolated hills, the most remarkable of which is Gungodi, a coralline tumulus similar to and greatly resembling Hatajwa near the south end of the island.

RAS NUNGWE or Hog point, the north extreme of Zanzibar island, is sandy with low cliff at the back, clothed with dense jungle. The fringing reef extends three-quarters of a mile northward and eastward, following the trend of the land to the southward at a decreasing distance. The land behind Ras Nungwe is undulating, and the highest trees are about 200 feet above the sea. See light, p. 381.

Anchorage.—There is good temporary anchorage, in the southwest monsoon, westward of Ras Nungwe in the northern approach to Kokotoni harbour, in 12 fathoms, sand, with the point bearing East, a little more than one mile distant.

ISLANDS.—**Tumbatu** is a narrow island $5\frac{1}{4}$ miles in length, $1\frac{1}{4}$ miles across at its widest part, and lying northward of Ras Oswawembe ; its nearest point is distant $1\frac{1}{4}$ miles from the Kokotoni shore.

The island is flat and rocky, being faced with low cliffs, excepting a portion of its east side, and is densely covered with trees 40 to 50 feet high. Its western side is straight and almost steep-to, the coral ledge nowhere extending off more than one cable distant. Off the southern point the reef is awash for $1\frac{1}{2}$ miles in the direction of Ras Oswawembe, and terminates in Mmawali sand head, which dries 11 feet at low water springs. Off the eastern or inner side of the island, the coral dries at an average distance of one mile, greatly contracting the passage into Kokotoni harbour.

Tumbatu has the reputation of supplying the best sailors and pilots for the Zanzibar seas ; there is no water on the island, the necessary supply being brought over from Kokotoni.

Puopo is a small rocky, wooded island, standing on the eastern edge of Tumbatu island reef. The reef here is steep-to.

Mwana Mwana is a small coral island covered with dense jungle, on the northern part of Tumbatu reef. The reef dries northward of Mwana Mwana for half a mile, and is shallow for a quarter of a mile more, while north-eastward the shoal water extends for $1\frac{1}{2}$ miles. The outer edge of this shoal water generally shows, but the island should be given a wide berth to ensure safety. Westward of Mwana Mwana the deep water is within one cable of the shore. See light, p. 381.

SHOALS in the Approach.—Leven bank is of coral with from 6 to 10 fathoms water, lying about 5 miles N. by E. $\frac{1}{2}$ E. from Ras Nungwe, with Kokotoni hill in line with the western extreme of that point, and Mwana Mwana island bearing S.W. It is $1\frac{1}{2}$ miles in length, a third of a mile in breadth, and steep-to, rising somewhat abruptly from a depth of 100 fathoms; in light winds it makes a good temporary anchorage.

Current.—At the Leven bank the current always runs north-north-westward, with a velocity in the south-west monsoon of from $2\frac{1}{2}$ to 4 knots an hour, decreasing to half that rate in the north-east monsoon. H.M. ship *Daphne*, 13th May 1873, outside Pemba—in lat. 4° S., long. 40° E., at noon, records the current—North 96 miles. The vessel was under sail, hove to part of the 24 hours, and in lat. $6^{\circ} 0'$ S. the previous noon.

Nankivell rock, with 3 fathoms least water, lies with the north point of Mwana Mwana island bearing S.W. distant $2\frac{1}{2}$ miles, and Ras Nungwe E. by S. $\frac{1}{2}$ S. distant 3 miles. This small patch is in the fairway of vessels rounding Ras Nungwe and Mwana Mwana, and care must be taken to avoid it. To clear the rock, keep Ras Nungwe lighthouse southward of S.E. by E. $\frac{1}{2}$ E., until the west side of Tumbatu opens westward of Mwana Mwana.

Shearwater patches.—Westward of Tumbatu island is an area of shoal water containing numerous patches of coral, covering a space of more than 8 miles north and south, by 4 miles wide, and varying in depth from a few feet to 10 fathoms, the nearest danger being $2\frac{1}{2}$ miles from Tumbatu island.

Wright rock, on the east side of the shallow ground, is a small head nearly awash, with the north point of Mwana Mwana island bearing N.E. by E. $\frac{1}{2}$ E. distant $4\frac{3}{4}$ miles, and $3\frac{1}{2}$ miles from Tumbatu island. One mile E.N.E. of Wright rock is a patch with $2\frac{1}{2}$ fathoms water, and is the nearest shoal to Tumbatu.

Langdon rock, near the south end of this area, is also nearly awash;

it lies with Ras Oswawembe bearing E. by S. $\frac{1}{4}$ S. distant 5 miles. At about three-quarters of a mile south-west of Langdon rock is another patch with one fathom water, and the southernmost of the Shearwater dangers. These reefs can sometimes be seen from aloft, but as they are frequently undiscernible until close-to, especially in the case of the smaller patches, vessels should keep about one mile only from the coast of Tumbatu island and Ras Oswawembe, which are both steep-to. Kokotoni hill bearing E. $\frac{1}{2}$ S. and seen over Ras Oswawembe leads southward of these dangers.

LIGHTS.—Ras Nungwe.—From a white square tower with red top, on Ras Nungwe, northern extreme of Zanzibar island (p. 379), is exhibited, at an elevation of 105 feet above high water, a light which *revolves about every half minute*, and is said to be visible in clear weather about 12 miles, but the exhibition, revolution, and visibility of this light are not to be depended on.

Mwana Mwana.—A lighthouse in course of construction (1881) on the north extreme of Mwana Mwana island, west side of entrance to Kokotoni harbour (p. 380), was 14 feet high at that time.

Mungopani.—At 3½ miles southward of Ras Oswawembe, and about 2 miles northward of the white pillar at Mungopani village, (p. 375), from a white lighthouse 90 feet high, with red top, is exhibited, at an elevation of 130 feet above high water, a *fixed* white light, said to be visible in clear weather from a distance of 12 miles.

Ras Kizimkazi.—A lighthouse in course of construction on Ras Kizimkazi (p. 364), south extreme of Zanzibar, was 12 feet high in 1881.

Palace.—An electric light is occasionally shewn from the Sultan's palace at Zanzibar town, but it is not intended for navigation.

Caution.—Too much dependence must not be placed on the exhibition of any of these lights. Apparently the completion of the lighthouses on Mwana Mwana and Ras Kizimkazi is abandoned.

KOKOTONI HARBOUR, formed between Tumbatu and Zanzibar islands, is a large and sheltered anchorage with depths of 4 to 9 fathoms. There are many little villages on the Zanzibar coast, and the country is well cultivated. Cattle, fowl, and eggs are plentiful. Most of the traders to Pemba start from Kokotoni.

Kokotoni is a district and village north of Mwanda. There is an extensive sugar estate here, in English hands, with a large factory on the banks of the Kipanga, fitted with steam machinery, both for sugar and cocoa-nut oil manufacture. The produce is either shipped directly to a vessel lying in Kokotoni harbour, or sent to Zanzibar by

dhow. A zinc-roofed shed on the beach marks the shipping place and termination of the estate road. The house of the manager of the estate stands on the summit of Kokotoni hill.

The Northern channel between the reefs fringing Tumbatu and Zanzibar has not less than 6 fathoms water throughout and is available at all times. Abreast the north point of Puopo island the channel is reduced to a quarter of a mile in width, southward of which the harbour opens out to $1\frac{1}{2}$ miles in width.

The Southern channel, adapted for vessels under 12 feet draught, lies between Ras Oswawembe and Tumbatu island. It is narrowed at the entrance to a width of one mile by Mmawali reef and the bank stretching northward from Ras Oswawembe; there is not more than $2\frac{1}{2}$ fathoms, mud, in the deepest part between these points.

Farther eastward, and midway between Ras Mwanda and Tumbatu island, is a bank of sand, part of which is awash. This bank nearly blocks up the channel, leaving a narrow passage between it and Ras Mwanda, 5 and 6 fathoms deep. The bank can generally be seen from aloft, but the water is not clear. North-eastward of the bank, the water again shoals to 4 fathoms, but the channel widens, and when Makutani reef, off the south-east point of Tumbatu (the mangroves only on which never cover) is abeam, the water again deepens to 7 fathoms.

Anchorage.—A good berth for a small vessel is in $4\frac{1}{2}$ fathoms, mud, off Kokotoni village, with the south point of Tumbatu island bearing W.N.W., and the eastern extremity of Puopo island N. by E. $\frac{1}{2}$ E. For a large vessel, a berth farther north, in 8 fathoms, mud, with the south point of Tumbatu island bearing W.S.W., and Puopo island N. by W. would be better, and the tide not so strong.

Tides.—It is high water in Kokotoni harbour, full and change, at 4h. 10m.; springs rise 15 feet, neaps 10 feet. The tidal streams run strong through Kokotoni harbour at springs. As a rule the flood runs southward, and the ebb northward, but both streams are much influenced by the wind. In the south-west monsoon, at neaps, the current is continuous to the northward, and during this season the greatest irregularity in the tides prevails. The tidal streams are strongest off Ras Mwanda.

DIRECTIONS.—Kokotoni Northern channel.—From about $1\frac{1}{2}$ miles off Ras Nungwe, steer for the north extreme of Mwana Mwana island, bearing S.W. by W., until Kokotoni hill bears S. by W. (well open eastward of Puopo island); steer for the hill on that bearing,

looking out for the reef, which stretches to a distance of nearly 2 miles off the coast of Zanzibar, and can generally be seen, until Gungodi hill bears S.E. by E. ; then alter course to S. $\frac{1}{2}$ E., keeping a sharp look-out for the reef extending north-eastward of Puopo island, which is very dangerous and difficult to be seen.

When the eastern extremes of Puopo island open of one another alter course and steer to pass at a distance of 3 cables from it. When the centre of Puopo island is abeam of the vessel, all dangers will have been passed, and anchorage can be chosen as desired. There is considerable swell at times northward of Puopo island, but it does not fetch home through the narrows to harbour.

Southern channel.—A small vessel intending to enter Kokotoni by the south channel must be guided mainly by the eye and the chart, as there are no good leading marks. To enter, bring Kokotoni hill to bear E.S.E., and steer in for it, passing the sand bank on Mmawali reef (which is always plain to be seen) at a distance of 4 cables. When Puopo island begins to open of Tumbatu island, the centre reef will be on the port beam, and should be made out from aloft ; in which case round it by eye, giving the visible part a good berth, as it deepens very gradually. Should the reef not be discerned when Puopo island begins to open, alter course for Gungodi hill, having Makutani flat islet slightly on the port bow ; this course will lead to the anchorage.

The water is very thick, concealing any shoal with more than 12 feet on it, and as the currents are strong, too much care cannot be taken. There is, however, no swell, and the bottom is generally soft

DIRECTIONS.—Zanzibar channel, Northern approach.—In making Ras Nungwe, the north point of Zanzibar island, due allowance must be made for the rapid current setting north-north-westward through the channel between Zanzibar and Pemba. In the south-west monsoon the current averages 3 knots an hour ; in the north-east monsoon about half that rate in the same direction. *See currents, page 363.*

Ras Nungwe, on which there is a lighthouse (page 379), makes as a low uniform woody point, and should be passed at a distance of about 1 $\frac{1}{2}$ miles to clear the projecting reef, which can always be seen by the breakers. To pass northward of Nankivell rock :—from off Ras Nungwe, bearing South distant 1 $\frac{1}{2}$ miles ; steer West, till the west extreme of Tumbatu island is open westward of Mwana Mwana island, when a vessel may steer to the southward along the Tumbatu coast at a distance of three-quarters of a mile.

Small vessels might pass southward of it, by steering for the north extreme of Mwana Mwana when bearing S.W. by W., until Ras Nungwe bears East, then steer West, which course made good, will lead in the fairway between the rock and Mwana Mwana reef, and when the west extreme of Tumbatu island is open westward of Mwana Mwana, steer southward along Tumbatu as before.

In either case Ras Nungwe must not be brought between the bearings of E. $\frac{1}{2}$ S. and E. by S. $\frac{1}{2}$ S. until the west extreme of Tumbatu is open westward of Mwana Mwana.

As the dangerous Shearwater patches do not generally show well, and there are other reefs to the southward at a few miles from the coast, vessels should keep along the land at the distance of three-quarters of a mile, to Mungopani lighthouse, when proceed through English pass as directed at page 377.

The above directions are for a steam vessel or for a vessel with a fair wind.

A sailing vessel in the south-west monsoon period should take the early morning, when the wind will probably be westward of S.W.; or the afternoon, after it has come round to the south-eastward. At either time she may lay along the land from Mwana Mwana island, and escape working to windward, which is to be avoided if possible, in consequence of the numerous outlying reefs to the westward. The shore of Zanzibar island should always be kept aboard to avoid the outlying reefs.

At night.—Lights have been established at Ras Nungwe, the north extreme of Zanzibar, and also at Mungopani, to assist in the navigation at night, but as these lights do not appear to be regularly attended to, the navigator must use his own discretion in the matter. See lights, page 381, and caution on page 371.

LEAVING ZANZIBAR.—Steam vessels leaving Zanzibar, will of course, take the channel that leads most direct to their port of destination, thence proceeding as directed in pages 34–39.

For sailing vessels, in either monsoon it will generally be better to make a fair wind of it, and leave Zanzibar by the lee pass. If bound southward in the south-west monsoon this may appear to put a vessel a long way to leeward, but probably nothing will be lost by it, for to work to the southward, an offing of 90 miles must be gained in order to be outside the main current, which runs strong along the land, and the offing will be gained sooner by leaving by the north channel.

A sailing vessel must leave Zanzibar anchorage in the morning to

make certain of anchoring off Ras Nungwe for the night (page 379), and should weigh from that anchorage with the first of the south-westerly or land breeze in the morning, and stand out to cross the strength of the current as soon as possible; a liberal allowance must be made for the current which sets about N.N.W. into Pemba channel. Any attempt in a sailing vessel to start with the afternoon sea breeze will result in the vessel being swept up Pemba channel, and if the morning wind be light, the same thing may occur; it would be better to run through Pemba channel at once than try to beat out to windward of it. There are no means of avoiding this drawback, and many vessels are set far north of Pemba before getting outside the current.

If bound northward in this season, the wind is favourable; steer through Pemba channel (p. 398,) during daylight, if possible. *See pages 34–39.*

If the South pass be attempted in the south-west monsoon period, leave either early or late, and anchor off Chumbe island if necessary until the wind shifts again at night.

During the north-east monsoon, a sailing vessel bound northward might lay along the land northward of the town by starting about 2 p.m., but she would have to anchor that night, and wait until the same hour next day, unless the morning were favourable for short tacks between Shearwater patches and Tumbatu island. Altogether a vessel would probably gain by running south, and round Ras Kizimkazi, the south point of Zanzibar, and getting into the fair current outside.

Anchorage may be obtained anywhere in Zanzibar channel in 25 fathoms or less, on an emergency, if overtaken by night or thick weather, except near the entrances.

EAST COAST OF ZANZIBAR.—From Ras Nungwe the east coast of Zanzibar island trends S.E. by S. for 6 miles to a point, abreast which is the island of Mwemba.

The coast is alternately of low cliff and sandy bays, and nearly straight. The coral ledge dries off for three-quarters of a mile and is steep. It always shows by the sea breaking heavily.

From opposite Mwemba island the coast of Zanzibar island trends southward in a gentle inward sweep to Ras Urua, a distance of 16 miles. This latter part is mostly sandy and low, backed by rising ground a few miles inland, and bordered by a coral ledge extending from a half to one mile from the shore, and steep-to, 30 fathoms being generally found at less than three-quarters of a mile outside the reef.

Northward of Ras Urua is a small bay in which are two large villages, Pongwi and Mdudu, where a boat can obtain supplies.

Abreast Ras Urua is a break in the rim of the coral reef, through which a boat can pass by watching an opportunity. There is generally enough water on the reef, inside the edge, to float a canoe.

MWEMBA ISLAND is a small sand island, covered with tall casuarina trees, standing on the inshore edge of a large coral reef, 4 miles long north and south, and 2 miles wide. The reef dries at low water springs with a steep edge, and is separated from the east coast of Zanzibar island, by a channel one mile wide, 50 fathoms deep, and free from danger. The inner or western point of Mwemba island is steep, and may be passed at a prudent distance. The island is resorted to by fishermen, and there is a small supply of good water in a masonry well, in the centre of the island.

Anchorage.—There is good anchorage three-quarters of a mile north of Mwemba island, in 10 fathoms, sand, where shelter will be found, in the south-west monsoon period, under the lee of the extensive reef.

Chuaka head, 5 miles south-eastward of Ras Urua, is a bold headland about 70 feet above the sea, faced with cliffs, and the northern extremity of a peninsula. It is surrounded by the coral reef, which stretches $1\frac{1}{2}$ miles northward of it, sheltering what anchorage there is in Chuaka bay. Its outer edge is not steep-to, and should not be rounded too closely, especially as the water is thick and discoloured.

CHUAKA BAY.—The coast from Ras Urua trends southward for 8 miles, forming the west side of Chuaka bay, the head of which is $3\frac{1}{2}$ miles across ; the peninsula which terminating in Chuaka head with its projecting reef, about 5 miles in length, forms the east side of the bay. The shores are all low, and generally sandy or mangrove, with several mangrove creeks at the head of the bay. This large bay is however, so shallow as to be nearly useless, and there is only a small area north-westward of the head available as an anchorage.

Halfway between Chuaka head and Ras Urua is a reef just awash, on which the sea usually breaks. Several villages stand on the shore, of which Chuaka, in the south-west corner of the bay, is the principal. Inland to the westward, several low but abrupt isolated coralline eminences rise above the surrounding vegetation.

Anchorage.—The best anchorage in Chuaka bay is between Chuaka head reef and the middle reef, in 5 fathoms, sand, with the

outer edge of Chuaka head bearing S.E. by S., and the fringing reef 3 cables distant. The tides set strongly and regularly into and out of the bay.

Coast.—From Chuaka head the coast, which is low and generally rocky, trends southward for 4 miles to a low rounded point, well covered with cocoa-nut trees; thence it is sandy and nearly straight to Ras Makunduchi, a rocky projection 16 miles southward of Chuaka head. There are several villages on the coast, and the coral ledge, which northward of Makunduchi village extends $1\frac{1}{4}$ miles from the shore, dries off on an average rather more than one mile, and is steep-to.

From Ras Makunduchi the coast sweeps in a curve for a distance of 9 miles to Ras Kizimkazi, and presents a uniform, low, cliff, backed by gently rising ground 100 feet in height. The cliff is only broken just southward of Ras Makunduchi, where there is a slight sandy bay, 2 miles in length. The coral ledge continues with the same features as before, but does not extend quite so far off the coast.

CHAPTER X.

PEMBA ISLAND, AND THE ADJACENT COAST, BETWEEN PANGANI BAY AND THE EQUATOR.

VARIATION IN 1889.

Pemba island, 9° 50' W.—Tanga bay, 10° 0' W.

PEMBA ISLAND.

General Remarks.*—Pemba island, named by the Arabs Al Húthera (the Green), lies 22 miles north-eastward of Zanzibar island, of which it is a dependency.

It extends in a north-north-east and opposite direction for a distance of 38 miles, and is about 13 miles wide (including the islands off its western side which protect the numerous harbours on that coast).

The reef off the western side of Pemba island is generally steep-to, and less than one mile from the coast or the islets.

The eastern coast of Pemba is faced with a reef extending about half a mile off, and is apparently steep-to, with breaks opposite several creeks that indent the coast ; these breaks probably afford passage in smooth weather to boats.

The height of Pemba island does not exceed 300 feet, and its surface is broken into ridges and valleys, covered with luxuriant vegetation. The soil is rich, the principal produce being cloves, most of the groves of which trees are situated on the western part of the island ; 120,000*l.* worth of this spice being about the annual export. All tropical cereals and edible roots flourish, and on the eastern side the Wapembe, or descendants of the aborigines, tend considerable herds of cattle. Cocoa-nuts abound. The island is governed by a Wali, appointed by the Sultan of Zanzibar, who resides at Chaki Chaki, the only town of any size in the island.

Pemba makes as a low island with uniform outline, and cannot be seen far at night unless by moonlight. By day it is visible from a distance of about 15 miles.

Harbours.—Chaki Chaki (p. 390) is the best harbour, and most easy of access ; it affords shelter for all classes of vessels, and from all winds, but the depths are inconvenient for anchorage in many parts of it.

Port Cockburn, p. 392, and port George, p. 393, are also good

* Derived from a Survey by Commander W. J. L. Wharton, H.M. Surveying vessel *Fawn*, 1878. See Admiralty general charts :—Delagoa bay to Ras Asir (Guardafui), No. 597 ; Africa, east coast, sheet X., including Zanzibar and Pemba islands, No. 664. Admiralty plans :—Kiuyu, Cockburn, George and Chakchak ports, No. 1812, scale $m = 1.5$ inches ; and Pemba, south-west portion, No. 1810.

harbours, but they are not so easily accessible. The best entrance to port Cockburn is through Chaki Chaki bay, by Owen channel. Port Kinyu (p. 395) is also a good anchorage.

Caution.—A good look-out from aloft should be kept when entering any of the anchorages in Pemba, as shoals may exist which are uncharted.

The tide runs strong in all the gaps except that of Mesale.

PEMBA—WEST COAST.—**Ras Upembe** (**Nassoon point**), the south-east extreme of Pemba island, is low and rocky, but steep-to.

Ras Miugani, the south-east extreme of Matumbene island, is similar in appearance to Ras Upembe, from which it bears West, distant about 5 miles.

Matumbene island, situated about 3 miles from Pemba island, is about 45 feet in height, and wooded. The intervening space between the island and Pemba, is encumbered with islets and shoals, with boats' channels known to the natives ; these have not been examined.*

Soleman island, wooded, and 40 feet high, lies off the north-west point of Matumbene. Matumbuu rock, 3 cables westward of Soleman, is about 20 feet high, and shows well when seen clear of the land. Kwata islet, about 25 feet high, lies 2 miles north-eastward of Soleman island, and is low and bushy.

Makungwi island, situated about $1\frac{1}{2}$ miles eastward of Kwata islet, is about 40 feet high, with cocoa-nut trees near its west end about 100 feet in height.

Reefs.—An extensive reef surrounds all the islands above mentioned, and nearly filling the space between them and Pemba. Its western edge passes a short distance westward of Matumbuu rock, half a mile westward of, and $1\frac{1}{2}$ miles north-eastward of Kwata, and the latter distance northward of Makungwi. Long prongs of reef and detached patches front the Pemba coast to the distance of 2 miles, in places, with anchorages between them, as far as Ras Kingoje.

Boat channels.—There is a gap in the main reef, about 3 cables southward of Kwata islet, thence leading between it and Makungwi island ; its least breadth is about $1\frac{1}{2}$ cables, with shallow spots in places ; there is a narrow passage leading from it, southward of Makungwi, but there is little depth in it at low water. These passages connect with the channel within Makungwi, not yet examined. The chart will afford more information than a written description of these intricate passages, which are much used by slave dhows.

Anchorages.—There appears to be good anchorage about one mile off Ras Bandao in 13 fathoms. If the single cocoa-nut at that point can be distinguished, steer for it when bearing S.E. by E. $\frac{1}{4}$ E., keeping a good look-out aloft, and anchoring when the east extreme of Makungwi bears South; or if wishing to anchor near Makungwi, steer in for the cocoa-nut tree as before, until the east extreme of Makungwi bears S. by E. $\frac{1}{4}$ E., when steer for it, avoiding, and anchoring eastward of the reef extending northward from that island.

There is apparently a secure anchorage in the bay between Ras Domoni and Ras Kingoje. Steer in with Ras Domoni, bearing S.E. $\frac{1}{4}$ E., until the extreme of Ras Kingoje bears N.E. by E. $\frac{1}{4}$ E., when steer East into about 12 to 10 fathoms water. There is apparently snug anchorage within Ras Domoni, but it has not been examined. These remarks are drawn from the chart and must be used with extreme caution.

CHAKI CHAKI BAY is included between Mkumbuu peninsula, Ras Kingoje, and the reefs off Mesale island.*

Though there are many shoals in it, there are also large clear spaces, and it affords many good anchorages. The eastern part gradually contracts to the mangrove creek on which Chaki Chaki town stands, 9 miles distant in an easterly direction from Mesale island.

The shores of this bay are richly cultivated with cocoa-nut trees, cloves, and cereals.

Ras Kingoje, the south extreme of that portion of Pemba island surveyed by H.M.S. *Fawn* in 1878, is the southern limit of the great bay of Chaki Chaki. It is a low point, and not easy to recognise from the westward.

Mwamba Kisima extends $1\frac{1}{2}$ miles westward of Ras Kingoje, and together with the shoal ground extending half a mile west of it must be avoided when entering Chaki Chaki bay.

Ras Tundauwa, distant 3 miles north-eastward of Ras Kingoje, is low and fringed with mangrove trees. There is a watering place on the north side, half a mile from the west extreme of the point.

Ras Banani, situated on the south side of the entrance to Chaki Chaki inlet, $2\frac{1}{2}$ miles eastward of Ras Tundauwa, is also low, but tolerably clear of bush. On it there is a white chimney resembling a beacon, which shows well when the sun is in a favourable position. There is another white chimney about a third of a mile south-west of that on Ras Banani.

* See Admiralty plan of West coast of Pemba island, No. 1,812; scale $m = 1\frac{1}{4}$ inches.

Mkumbuu is a narrow peninsula that divides Chaki Chaki bay from port Cockburn. It is of an uniform height of 50 feet, and has many cocoa-nut and palmyra palms. Its western extremity is formed by high mangrove trees.

Dongo Kundu is a narrow wedge-shaped projection of bright red sandstone, which extends from the south side of Mkumbuu peninsula, and is a conspicuous object.

Mesale island, on the west side of the entrance to Chaki Chaki bay, is low, covered with dense forest which attains a height of 70 feet above the sea, and is about one mile in length.

Mesale island is situated on a reef which dries for the distance of about 6 cables south-westward and south-eastward ; on these sides also shallow water extends some distance from the edge of this reef, but on the northern side it is steep-to. Northward from Mesale island the reef extends about one cable off, forming the south side of Mesale gap.

Mesale island appears to stand out well from the land behind, when seen from any direction.

Position.—The Observation spot, north-east extreme of Mesale island, is in lat. $5^{\circ} 14' 9''$ S., long. $39^{\circ} 36' 18''$ E.

Mesale gap, situated north of Mesale island, and between it and the reef of Uta-wa-limani, is deep, but is not recommended, except at low water and when the sun is in a favourable position, as the reefs on either side are not steep-to, and sometimes do not show well. No leading mark can be given for this channel.

Anchorage.—Directions.—To enter Chaki Chaki bay ; bring Ras Tundauwa to bear E. $\frac{1}{2}$ N., when the white chimney on Ras Banani will appear in line with it ; steer with this mark on until the left extreme of Mkumbuu peninsula bears N.N.E. $\frac{1}{2}$ E., when steer for that extreme until the south point of Mesale island bears West. Steer East from this position, with a somewhat remarkable hill with a flat top covered with cocoa-nut trees known as Mifuni hill, directly ahead. This course pursued for a distance of nearly 4 miles will lead to a good anchorage in 10 fathoms, with Dongo Kundu bearing N.W., and Ras Tundauwa bearing S.S.W. $\frac{1}{4}$ W.

Or ;—when the south extreme of Mesale island bears West, steer E. by S., with a large white castellated house in Chaki Chaki town seen over a mangrove islet in the centre of the narrows west of Ras Banani. This will lead to the anchorage in 8 fathoms, north-north-westward of Ras Tundauwa.

Good temporary anchorage may also be obtained in the north-east monsoon period, or during calm weather, on the bank south of Mesale island in 6 fathoms.

Chaki Chaki is a long straggling town picturesquely situated among mango and cocoa nut trees at an elevation of 40 feet above high water.

There is a dilapidated fort in the town, which is not conspicuous, but some of the stone houses show very clearly from Mesale island, especially the northernmost one, which is castellated.

The town cannot be approached at low-water springs even in the smallest boat, the creek drying completely across, but at half tide there is a sufficient depth of water for a steam pinnace.

PORt COCKBURN is a harbour of great capacity, though much obstructed by reefs, and in many parts having inconveniently deep water. Long bays and creeks indent the shores, in some of which good anchorage can be found; Kokota, Funzi, and Pemba islands divide port Cockburn from port George. Port Cockburn may be entered either by Owen channel or Kokota gap.

Owen channel, leading from Chaki Chaki bay to port Cockburn, is deep, but contracts at one part to a width of 4 cables between the 3-fathom lines. It lies between Uta-wa-limani and the reefs north-eastward of it, and the reef extending from Mkumbuu peninsula. No good leading marks can be given for this channel, but at low water, with care, by the aid of the Admiralty chart, there is no difficulty in its navigation.

Mwamba Mkumbuu is an extensive reef extending west from Mkumbuu peninsula; its south-west extreme, on which are isolated patches dry at low-water springs, is situated $1\frac{1}{2}$ miles from the peninsula; it shoals very gradually from seaward, and is difficult to distinguish.

Uta-wa-limani is a long reef extending from Mesale gap to Vikunguni islands, a distance of 4 miles in a northerly direction. This reef is tolerably steep-to on its western edge, but to the eastward it slopes gradually. It dries in places, principally at the southern part.

Vikunguni and Kashani islands are both long, narrow, and rocky, being situated on the outer edge of the sea reef $4\frac{1}{2}$ miles northward of Mesale island. Off the south extreme of Vikunguni the Three islets, 15 feet high, are very conspicuous.

Mapanya island is rocky, with one or two baobab trees, 30 feet high, that show conspicuously above the other trees; it is situated on the eastern horn of the same reef as the Vikunguni islands.

Kokota island, separated from Kashani and Mapanya islands by

Kokota gap, has a rocky sea face, and is covered with moderately high vegetation, but has very few palm trees upon it.

Funzi island, situated three-quarters of a mile eastward of Kokota, has a central plateau 40 feet in height, covered with lofty palmyra palms and cocoa-nut trees to about 100 feet in height. There is a well on the north side of this island.

A patch of 4 fathoms or less, with 10 fathoms close to lies with the east extreme of Funzi bearing N.N.E. $\frac{1}{4}$ E., and south extreme W. $\frac{1}{2}$ N.*

Pembe island, lying eastward of Funzi, is somewhat like it in appearance, but smaller, and has more mangrove trees round it. Some red cliffs at the south-west extreme are conspicuous.

Directions.—**Kokota gap** is a passage from seaward through the outer reef into port Cockburn, passing northward of Kashani and Mapanya islands, and south of Kokota island. This gap is deep, with well defined edges that dry at low water. About half a mile eastward of Mapanya island are situated two large coral banks, with 4 feet water on the southern and about 10 feet on the northern. The best passage is between these banks, which do not always show well. The east end of Kashani well open of Kokota leads between these banks, as does also the west end of Kashani, touching the north extreme of Mapanya; but it is recommended to navigate at low water by the eye, with the aid of the Admiralty chart. Within the gap, the same method of proceeding must be adopted, to the required anchorage.

The best entrance appears to be through Chaki Chaki bay and Owen channel, before mentioned.

The passages between Kokota, Funzi, and Pembe islands are not recommended, as they are narrow and intricate. Between Pembe island and the mainland the channel dries at low-water springs.

PORT GEORGE is a large harbour somewhat similar to port Cockburn, but more obstructed by reefs. A long and tortuous creek, similar to that at the eastern part of Chaki Chaki bay, extends inland for some distance from Wetí at the north-east corner of this inlet. The shores of port George are densely populated and well cultivated.

The western side of this extensive harbour is formed by the islands of Uvinje and Fundu, southward of which is Uvinje gap, the principal entrance.

Pasi islet, 20 feet high and covered with scrub, is situated in the centre of the southern part of port George.

A patch of $2\frac{1}{2}$ fathoms, coral, with 6 to 8 fathoms around it was found by H.M.S. *Penguin*, 1888, in the anchorage southward of port George, with Pasi islet bearing N.W., distant $9\frac{1}{2}$ cables.

Uvinje island, on the western side of the channel, and abreast Pasi islet, is a rocky island on the outer reef, separated from Kokota island by Uvinje gap. It is covered with scrub and has several clumps of tall casuarina trees. On its western side are several sandy coves where boats may land at high water.

Fundu island is the largest of the outlying islands which form the western side of port George, being $5\frac{1}{2}$ miles in length and half a mile in breadth. It is flat, without any conspicuous feature, partly cultivated, and has large groves of palmyra palms. There are many small sandy bays on the western shore of Fundu island.

Haramu passage, between Uvinje and Fundu islands, affords at half tide a boat passage. At low-water springs it is dry.

Directions.—**Uvinje gap** leads into port George northward of Kokota island, and is a perfectly clear channel, safe to navigate when the sun is in a favourable position. A vessel when entering should keep along the edge of the reef on the northern side of the channel until abreast of Pasi islet, to avoid the detached coral shoal north-eastward of Kokota island. There are two small grass-covered rocks on the reef which forms the north side of the channel; the western (a double rock 10 feet high) is about 30 yards within the edge of the reef. The eastern rock, also 10 feet high, is situated about 2 cables within the edge of the reef.

A conspicuous baobab tree on the east extreme of Mapanya island in line with the east extreme of Kokota island, astern, leads in mid-channel from Uvinje gap to the northern part of port George; this mark however leads very close westward of a shoal of 4 fathoms, situated N.N.W., distant 4 cables from Pasi rock; the mark should be shut in a little when nearing this shoal.

Caution.—It is advisable to navigate all the gaps at low water.

Anchorage.—There is a good anchorage in port George in 8 fathoms off Mkia-wa-Paca, with Pasi islet bearing S.W. $\frac{1}{4}$ S., and the north extreme of Uvinje island bearing W. by N. $\frac{1}{4}$ N.

There is also good anchorage in the north-east part of this harbour about $1\frac{1}{2}$ miles west of the entrance to Wetì creek.

Inner passage.—The passage from port George northward to port Kishi-Kashi, is shallow, and is not recommended, though available for vessels drawing 10 feet.

KISHI KASHI PORT is small and much obstructed by reefs; it has a somewhat intricate entrance, for though the outer part of the channel (Fundu gap) between the islands of Fundu and Njao is deep and straight, it is narrow, being in one place only about half a cable in width, and the sides are not quite steep-to: the passage also turns sharply to the southward immediately the gap is passed.

If Kishi Kashi port were properly buoyed it would be an excellent harbour, but being without natural leading marks, boats should be anchored on the edges of the reefs in order to enter with safety. It is advisable to anchor in the south-east part of the harbour, where there is most room for swinging and no current is experienced.

At Kishi Kashi port the chief of the Pemba Arab aristocracy resides. He owns all the north part of Pemba island.

Njao island, situated northward of Fundu island, between which is the entrance to Kishi Kashi port, is similar to Fundu in appearance. Fundu rock, about 30 feet in height, stands on the edge of the reef near the centre of Njao island, but only shows clear of the island when very close in.

PORt KIUYU is a more available harbour than Kishi Kashi port. The entrance is wider, and the clear space inside larger and more directly opposite the entrance. A good berth is in 12 fathoms with the south point of the main island eastward of Njao island, bearing S.W., and the north-east extreme of Njao island bearing N.W. $\frac{1}{4}$ N.

Many creeks and bays indent the shores of port Kiuyu, but they are all shallow.

The shores of port Kiuyu are not so thickly inhabited as those of the harbours southward of it.

Directions.—Njao gap leads from seaward into port Kiuyu. The sides are well defined, except at the southern entrance point, where the reef extends $3\frac{1}{2}$ cables from the shore, and shallow water extends some distance from the extremity of the reef. The reef on the northern side of the channel is steeper.

To enter Njao gap, bring a cluster of cocoa-nut trees near Kiuyu village, just open northward of a dead baobab tree on the north-east extreme of Njao island, bearing S.E. by E. $\frac{1}{4}$ E., and steer in on this line until nearly abreast of the north-west extreme of Njao island; from thence keep in mid-channel.

NORTH COAST.—North of Njao gap the coast is nearly straight, with occasional little sandy bays, to Ras Kegomacha.

Aspect.—The appearance of the north coast of Pemba island is that of a low tree-covered country, the outline being very uniform; the only point which can be recognised being the low clump on Ras Kegomacha.

Pemba island is safe to approach at night from the northward at a moderate speed and with the lead going. The Pemba knolls are described below.

MSUKA BAY is situated immediately east of Ras Kegomacha, the north-west extreme of Pemba island, and is a good anchorage, well protected by reefs on nearly all sides. During the north-east monsoon a little swell probably fetches home, but it would even then be a safe anchorage. Msuka is the name of the district on the shores of Msuka bay. A good many dhows are built here.*

Ras Kegomacha is a rocky point with a conspicuous clump of trees 60 feet in height.

Kegomacha reef dries for a distance of 2 miles north-eastward of Ras Kegomacha; the discoloured water north of this reef makes it appear more extensive than it really is. A sand cay, situated 6 cables northward of Ras Kegomacha, dries 10 feet at low-water springs.

Directions.—To enter Msuka bay from the southward, do not round Ras Kegomacha until Ras Kiuyu, the north-east extreme of Pemba island, bears S.E. by E. $\frac{1}{4}$ E., to clear Kegomacha reef, and when the east extreme of the long sandy beach at the head of Msuka bay bears South, steer for it, and anchor in 6 fathoms with Ras Kegomacha bearing N.W.

Sisini creek, situated about $4\frac{1}{2}$ miles south-eastward of Msuka bay, is a long but shallow inlet, with several islands and villages. Sisini village lies at the head of the inlet. There is good shelter for dhows in this inlet.

Ras Kiuyu, the north-east extreme of Pemba island, is a rocky promontory covered with bush, and faced by cliffs about 20 feet in height. On the north side of the point the reef extends but a short distance from the coast, and the anchorage north-west of the point is unprotected.

Pemba knolls.—The space between Ras Kiuyu and Ras Kegomacha, is occupied with numerous reefs, known as the Pemba knolls.

* See plan of Msuka bay on No. 1812; scale m = 0·5 of an inch.

The eastern of these only dry at low-water springs, but always break heavily.

Kundeni knoll, the northern of the group, dries 3 feet at low water, and is situated N.E. by E. distant $4\frac{1}{4}$ miles from Ras Kegomacha.

There is a bank with 4 fathoms least water, lying 2 miles N. by E. of Kundeni knoll.

Funguni knoll, lying $4\frac{3}{4}$ miles E. $\frac{1}{2}$ N. from Ras Kegomacha, has a large sand cay which dries 8 feet at low-water springs; Punga Punge lies 2 miles seaward of it. Several patches dry at low-water springs, lie between them and Ras Kiuyu.

The bank of soundings to the depth of 100 fathoms extends for 11 miles northward of Pemba island ; but little current is experienced when on it.

EAST COAST.—The east coast of Pemba is rather low, and should be approached with care at night, but there does not appear to be any danger beyond the coast reef, which, it is stated, nowhere extends more than one mile off, and is steep-to. Within 2 miles of the coast no soundings have been obtained with the hand lead.

TIDES and CURRENTS.—It is high water, full and change, at Mesale island (west coast) at 4h. 0m. Springs rise 12 feet, neaps 8 feet.

In the northern part of Pemba channel, near the coast of Pemba island, the flood tide setting to the southward neutralises and at times overcomes the constant north-going current, and the ebb accelerates it. In the southern part of Pemba channel the set is always to the northward, but the amount the current is influenced by the tidal stream has not been ascertained. However, the set of the current in mid-channel is about N.N.W., from 2 to 4 knots in the south-west monsoon period, and 0 to 2 in the north-east monsoon ; towards the northern part it also sets in the line of the axis of the channel, or about N.N.E. When at its strength it frequently causes a strong ripple near the island, having the appearance of breakers. At all times a vessel proceeding through Pemba channel will find less current near Pemba island than in mid-channel. The tide runs strongly in all the gaps except that of Mesale.

North-east and eastward of Pemba island the current sets about N. by W., or rather on to the island, and renders any estimation of position very difficult. In December (North-east monsoon period), off the east coast, it has been found as little as three-quarters of a mile an hour.

PEMBA CHANNEL.—DIRECTIONS.—The navigable portion of the channel is contracted by the Wasin and North and South Head reefs bordering the African coast, to a width of 26 miles at the southern entrance, and 19 miles at the northern, but between these dangers and the island it appears to be all deep water.

The eastern side is safer than the western, as the reef extends but a short distance from Pemba island, less current is experienced, and the land is nearer to guide the navigator; but, on the other hand, Pemba island is notorious for its large rainfall, and frequently will be enveloped in rain squalls and clouds, when the western side of the channel is clear.

A steam vessel proceeding northward from Zanzibar, through Pemba channel should, from abreast Mwana-mwana island, shape course direct for Ras Kegomacha; this will allow for the strong northerly current, and lead clear through Pemba channel. *See directions from Zanzibar, page 384.*

A vessel approaching from the northward, and being able to make Pemba island in daylight, is recommended to steer for Ras Kegomacha, and keep close along the eastern shore of the channel as far as Mesale island; then steer for Mwana-mwana island, allowing about 2 points to the southward for set of current.

The three islets southward of Vikunguni island, and about $4\frac{1}{2}$ miles northward of Mesale island, are easily identified, and useful for checking the position of the vessel. The reef southward of them shows well with the sun to the westward.

There is nothing to prevent a vessel approaching from the northward, from passing through Pemba channel at night if the weather be tolerably clear; and as before remarked, the island may be approached from that direction at a moderate speed, with the lead going, but it may be more prudent to keep well outside for the night, and steer in at daylight.

Good anchorage may be obtained south of Mesale island, entrance to Chaki Chaki bay, if not wishing to proceed across to Zanzibar at night. *See page 391.*

MAINLAND.—COAST.—The description of the main land is now resumed from page 358.

From Pangani bay northward to Tanga bay, the coast of the main land, is low, but well wooded, and apparently fertile. The shore is sandy, with occasionally a small intervening cliff of coral;

but it is unsafe to approach within 4 miles on account of the isolated reefs which lie off it at about that distance. Except in one part, where the coast is a kind of putrid marsh, the shores are lined with villages which are always conspicuous by a lofty grove of cocoa-nut trees, in the midst of which they are built.

South Head reef, of sand and coral, situated about 3 miles north-eastward of Briton shoal (page 356), is apparently 3 miles in length, and about the same distance from the coast, with deep water in-shore of it. Fungu Tongone lies about the same distance off-shore at about $3\frac{1}{2}$ miles northward of it.

Caution.—Little is known of these reefs, or of the Karange islands, lying between Tongone and Tanga bay ; they should therefore be given a wide berth.

TANGA is the largest town on the main land of Africa, in the vicinity of the Zanzibar islands. As Bagamoyo is the point of departure for caravans bound to Unyanyembe and the Tanganyika lake, so the trade for all the country to the northward as far as the Victoria Nyanza passes through Tanga. It stands on the south shore of a sheltered harbour, about one mile in length, 3 cables in width, and with depths of 4 to 8 fathoms, to which a broad channel through the outer line of reefs affords easy access.*

The river Zigi (named Mgambo at its mouth) falls into the northern part of Tanga bay, but is only navigable for a few miles on account of rapids ; and the shallows at its entrance are impassable at low water. Above Amboni the river passes between some limestone hills, and the scenery becomes very pretty, which is unusual with African rivers so close to the sea.

Aspect.—The coast in the vicinity of Tanga is low, and thickly populated and dotted with villages, especially to the southward. These villages in many instances have small creeks leading to them, up which dhows pass at high water ; the entrances to these creeks being merely breaks in the mangroves which line the shore, are difficult for a stranger to discover.

If the weather is clear, the Bondei mountains, the eastern spurs of the Usambara mountains, which cover a large tract of country, from lat. $4^{\circ} 30' S.$ to $5^{\circ} 20' S.$, and rise about 23 miles from the coast, will be conspicuous. Mbringa, the most prominent of the Bondei mountains, is a three peaked hill, the centre and highest peak of

* See Admiralty chart :—Tanga bay and approaches, No. 663 : scale, $m = 1\cdot9$ inches.

which is about 3,600 feet above the sea, 24 miles from the coast, and in about lat. $5^{\circ} 5' S.$ Rukindo, a double peaked mountain 8 miles northward of it, is also prominent with certain lights. Some of the distant peaks of this range must be nearly 10,000 feet high. During the south-west monsoon, however, these mountains are frequently obscured by haze, or perhaps only the easternmost of them will be dimly seen ; during the north-east monsoon they are generally clear.

At 17 miles northward of Tanga, and about 6 miles from the coast, are three rounded hills, the northernmost of which, Kilulu, is about 1,500 feet above the sea ; Kirimba is the name of the one next southward ; these will nearly always be visible. Farther north are two isolated conical mountains, 15 miles north-westward of Wasin ; Jumbo, the more distant, is 2,500 feet high ; Mrima is somewhat lower and truncated ; both are visible from Pemba island. The land elsewhere is low and flat, with the exception of the Amboni hills, which are immediately north-west of Tanga, and serve well to mark its position. These hills, about 500 feet high, are rounded and present no defined summit, but there is a well marked saddle between the two southernmost and highest eminences, which serve as one of the leading marks for entering.

There are several islands off this part of the coast, which are all low and densely wooded. In clear weather they are at times difficult to distinguish from the mainland, but with any haze they appear distinct. Karange, 8 miles southward of Tanga, is the southernmost of these islands ; Yambe, the next to the northward, will be known by a high group of trees towards its northern extremity. The islands to the northward of Tanga are so close to the coast that they are difficult to distinguish until near the off-lying reefs.

REEFS in the Approach to Tanga.—There is a nearly continuous line of outer reefs which run parallel to the land at varying distances, with navigable passages between them here and there. These reefs, with few exceptions, break at all times, and dry at low water ; they are not always steep-to, and should be given a fair berth.

Yambe island and reef.—Yambe reef, on which is the island of the same name, is $3\frac{1}{2}$ miles in length, and dries from one to 6 feet at low water. Between it and the northern end of Karange reef is the entrance to a good anchorage, but as yet only partially examined ; a shoal of $1\frac{1}{2}$ fathoms lies apparently in mid-channel. Inside Yambe there is only a boat passage at low water. The island is about $2\frac{1}{2}$ miles in length, and densely covered with jungle ; there is a clump

70 feet high near its north extreme. A small islet lies off the north end of Yambe, and is a good object for assisting to fix a vessel's position. Between Yambe and Niule, the next reef to the north, is a wide passage, but as a narrow rocky ridge with 2½ and 3 fathoms water on it joins these reefs, it is advisable, except in light draughts, to take the Ship channel in preference.

Niule reef is 2½ miles in length, with its northern end bearing E. by S. distant 4½ miles from Ras Kasone. It is of coral, dries in patches at low water, and a large sand cay, whose height varies with the monsoon, lies on the north-west side of the reef. Except at high tides, this sand cay is dry, but in rounding the reef it must be remembered that the cay is a long mile from the north end, and that shallow water extends some distance north and eastward of the reef.

Fungu Nyama is a quadrangular-shaped reef 2½ miles across east and west, lying 1½ miles north-eastward of Niule, and drying in patches at low water springs. A large sand cay lies near the centre (which dries about 10 feet), about the same height as the one on Niule reef, but of greater extent.

From one mile and less southward and eastward of Fungu Nyama is a ridge with 2 and 3 fathoms water; it extends partly across Ship channel and does not generally show.

Mwamba Wamba, a large reef, which dries, at 2 miles north-east of Fungu Nyama, has also a sand cay, but not so high as that on Nyama. The passage between Wamba and Nyama is encumbered by several rocky patches, which have not been sufficiently examined to insure that they are not dangerous.

Ulenge island presents a featureless line of mangrove trees and rocky points, with a conspicuous islet off its south end. The island lies on the shore reef, which dries between it and the mainland at low water.

Ulenge reef is a detached patch barely awash at low-water springs, lying 1½ miles southward of Ulenge island. The water is thick or discoloured around the reefs.

Dixon bank is a small coral patch with 3 fathoms water on it, lying E. by S. ½ S. 2 miles from Ras Kasone, and about one mile southward of Ulenge reef.

TANGA BAY for a large part of its area is shallow, but there is ample room and depth of water between the island and town for many vessels. The water is discoloured on and within Ulenge reefs,

so that the reefs cannot be distinguished, but near the outer ones, Niule and Nyama, the water is generally clear. The southern shore of the bay is steep, being the edge of a plateau 50 feet above the sea. The town stands on the plateau half concealed in cocoa-nut and mango tree groves ; the shores of the bay elsewhere are mangrove swamps.

A white pillar stands on the edge of the plateau eastward of the town, and is used as a leading mark between the reefs of Tanga island and Ras Kasone.

Ras Kasone, the south point of Tanga bay, is cliffy, but covered with vegetation which conceals the cliff everywhere ; but in one spot, about half a mile to the southward of the point, where, with the sun to the eastward, a piece of red cliff shows very distinctly. A low line of mangroves surrounds Ras Kasone on all sides. The reef around Ras Kasone is steep towards the north-east, but shoals off gradually for more than 3 cables to the northward.

Tanga island.—The north end of Tanga, the small island westward of Ras Kasone, is very similar to that point, showing a bluff with mangroves stretching to the northward, but it may be distinguished from the latter by being bare and showing red.

Position.—The observation spot on Tanga island is in lat. 5° 3' 45" S., long. 39° 6' 53" E.

Ras Chongoliani, the north point of the bay, has detached patches of reef extending 8 cables to the southward, narrowing the entrance of the bay.

Ship channel, between Fungu Nyama and Niule reefs, is deep, three-quarters of a mile wide, and the best approach to Tanga bay.

Anchorage.—There is a good anchorage anywhere abreast Tanga island, but it will be much cooler to anchor as far out as possible, as the plateau in the rear of Ras Kasone shuts off the wind in either monsoon, if a vessel is too far in.

A good berth is in 7 fathoms, mud, with the north extreme of the mangroves off Ras Kasone bearing E. $\frac{1}{2}$ N., and the extreme of the mangroves off the north-east point of Tanga island N.W.

Tides.—It is high water in Tanga bay, full and change, at 4h. 0m. ; springs rise 12 feet, neaps 7 feet.

Supplies.—There is no better place on this part of the coast of Africa for supplies, than Tanga. Meat is very good, and fish, vegetables, and fruit are abundant. There are many wells in the

town and vicinity, but the water from the former should be avoided, as it is nearly certain to be impregnated with sewage. The greater part of the cattle, sheep, and goats imported into Zanzibar is from Tanga.

Directions.—To enter Tanga bay from the southward, by Ship channel, between Niule reef and Fungu Nyama, keep the rocky islet (10 feet) off the south extreme of Yambe island bearing southward of S.W. $\frac{1}{2}$ W. until the north-east point of Ulenge island bears N.N.W. $\frac{1}{2}$ W., then steer for it, passing about 3 cables eastward of Niule reef ; when the north cliff of Tanga island bears W. $\frac{1}{2}$ N., open of Ras Kasone (if the weather be clear, the northern of three peaks in the front Usambara range, will be in line on this bearing, *see* sketch on plan), steer for it, until the entrance of Mgambo river is in line with the saddle between the southern summits of Amboni hills, bearing N.W. $\frac{3}{4}$ W. ; then steer for the river until the north-west cliff of Tanga island bears W. by S. $\frac{1}{2}$ S. ; when alter course to West until the white pillar bears S.S.W. $\frac{1}{2}$ W., which bearing will lead to the anchorage.

Light draught vessels from the southward can enter between Yambe island and Niule reef. The least depth over the rocky bar is about $2\frac{1}{2}$ fathoms ; the eye must be the guide between the reefs.

Shelter may be obtained in either monsoon under the lee of the outer reefs, should it be desirable not to enter Tanga bay.

Kwale bay is another sheltered anchorage, situated northward of Ulenge island, Tanga bay. The entrance between the reefs fringing Ulenge and Kwale island is about 3 cables wide, and clear of danger, but the shores of the bay are all mangrove, and bordered by shallow water. There are several villages in the bay, but nothing to attract a vessel under ordinary circumstances. There is a boat passage to the northward from Kwale bay between Kwale island and the mainland.

NORTH HEAD REEFS are a continuation of the off-shore reefs fronting Tanga and Kwale bays ; their northern extremity is charted 10 miles north-north-eastward of Mwamba Wamba, and nearly 8 miles off-shore. Between this extreme and the reef extending southward of Wasin island, a distance of 5 miles, no soundings have been taken ; the shoals, therefore, as well as the adjacent coast, must be approached with caution.

COAST.—The coast between Tanga and Wasin is low, faced with the usual coral cliff or sand, with several villages, the principal of which is Vanga, on the Umba.

Umba river.—Information on the course of the Umba, is conflicting. Its mouth lies in lat. $4^{\circ} 40\frac{1}{2}'$ S.

Vanga is a town of 2,500 inhabitants, surrounded by a wall in bad repair, and governed by an *Akida*, who is supposed to rule the coast, subject to the Wali of Mombaza. There are large sugar and cocoa-nut plantations in rear of the town.*

It is situated on a river which falls into the sea at about one mile northward of the Umba. This river has two entrances. At half-tide the northern mouth, which is situated with Wasin island shut in behind Sii island is almost 100 yards in width, and available for a steam cutter as far as the town, which is about half a mile from the mouth; the river is reduced to about 25 yards in width at a short distance up.

Anchorage.—There is anchorage in 6 fathoms, at about $1\frac{1}{2}$ miles off the southern mouth of the Umba, with Wasin island about one point open southward of Sii islands.

Inshore passage.—Between Tanga and Wasin islands there is a navigable channel inside the reefs, which has not yet been examined; but the *Fawn* in 1878 found no difficulty in proceeding from Tanga island as far as Gomani bay, east of Kiluli hill. No reefs were seen, and it is only requisite to keep about a mile from the shore. Gomani bay is dry at low water.

Eastward of Gomani bay are the following reefs, all plainly visible :—

Mwezi, situated about three-quarters of a mile from the shore. Kipwa Mtu, a very small reef which dries, lying two miles offshore; and Bunjau, a slightly larger reef, but not so shallow, lying half a mile eastward of Kipwa Mtu.

H.M.S. *Fawn* passed between Mwezi and Kipwa Mtu reefs, but it appeared clear between Mwezi reef and the shore.

Proceeding northward from abreast these reefs, bring the east extreme of Sii island to bear N.N.E. $\frac{1}{2}$ E., and steer for it until a small conical apex of trees about one mile east of Ras Magombani bears N.E., when steer for the trees.

The vessel will now be between shoals, and must proceed with care, as this part of the channel has not been examined. When the west extreme of Sii island bears N.W., steer N.E. by E. with Ras Kiromo ahead (Ras Kiromo appears as the next clump eastward of the conical apex of trees).

When within three-quarters of a mile of Ras Kiromo, steer east-

* H.M.S. *Dragon*, 1886.

ward along the land and anchor in about 9 fathoms, off Wasin town.

This inshore channel would be useful to vessels proceeding during the south-west monsoon period, when short of coal, as all current is thereby avoided.

WASIN ISLAND, in lat. about $4^{\circ} 40' S.$, is not easily distinguished from the southward, as it is blended with the island northward of it, from which it is separated but a short distance, forming a safe anchorage in any weather.

A village stands on the north side of Wasin island near the west end, and off it is the anchorage. Wasin is under the sub-governor of Vanga, the head man of Wasin being a Cadi.

Wasin islets and reefs.—Reefs extend a considerable distance off the island; a patch of $1\frac{1}{2}$ fathoms and about one mile in extent lies nearly 2 miles off its east extreme. There is also doubtful ground at one mile north-eastward of this patch; a depth of 6 fathoms has been found here, with Jombo peak on with Rashid point, and the centre of Wasin island bearing West. Jombo peak, well open of Rashid point, leads north-eastward of this reef.*

Extensive reefs, known generally as Mwamba Madira, lie to the southward of Wasin island, with the two Kisiti islets or rocks south-eastward of them, each about 30 feet in length. There are also two other islets on the eastern part of the reefs; Pungutiayu, the south-eastern and smaller of the two, is wooded, and about half a mile in length; Pungutiachi, the northern islet, is also wooded, and when first seen from the southward appears like a number of small islets; some tall trees on its eastern end are conspicuous. These islets and reefs should be approached with caution, as there are no soundings with the hand lead until close-to.

WASIN HARBOUR, on the north side of Wasin island, is a safe anchorage, with from 6 to 10 fathoms. Its eastern entrance appears to be clear of danger. The western entrance, or inshore passage from Tanga, has been described on page 404. At about half a mile westward of cape Wasin, near the northern shore, is an islet resembling a haystack, and about half a mile west of the islet, is a shoal at one cable distance from the shore.

Supplies.—Bullocks, sheep, and fowls, may be obtained at the village, but no fruit or vegetables; gazelle are to be shot outside the village. Fish may be had in abundance with the seine. The inhabitants are friendly.

Directions.—Anchorage.—The approach to Wasin, in clear

* Nav. Lieutenant E. Nankivell, H.M.S. *Daphne*, 1873. Less water probably exists.

weather is easily identified by a bearing of Jombo or Mrima, the Wasin peaks, which are visible as far as from Pemba island. From the southward, keep about 5 or 6 miles off Wasin island, until the Wasin peaks are their own breadth open of Rashid point (2 miles north of cape Wasin), then steer in for them until the north-west point of Wasin island is in line with cape Wasin ; then keep W. by S. for the middle of the entrance, eastward of the bank which extends half a mile off the shore northward of cape Wasin, and which is steep-to, with bushes growing on it in places ; thence in mid-channel to the anchorage off the town, where there is a depth of about 10 fathoms with the west extreme of Wasin island bearing S.W. $\frac{3}{4}$ S., and east extreme E. by S. $\frac{3}{4}$ S. A reef fronts the bight in which the village is situated, rendering landing awkward at low water ; a too near approach to it must be guarded against when anchoring. *See Inshore passage to southward, p. 404.*

COAST.—**Pongwe bay**, north of Wasin island, seems encumbered with shoals ; there are many villages on its shores. A passage, dry at low water, lies between the large island northward of Wasin island, and the main. The natives call this island the mainland.

Funzi reef, formerly an islet, lies in the entrance to Pongwe bay.

Pongwe point is higher than the rest of the adjoining coast, having a conspicuous clump of trees ; it makes as an island when seen from the northward.

There is foul ground for some distance south-eastward of Pongwe point, and reefs front the coast northward of it to the distance of 1½ miles or more in places, with irregular depths beyond, as far as Chala point.

Chala island, lying N.E. $\frac{1}{2}$ N. from Pongwe point distant 10 miles, is conspicuous, having high trees upon it, and white sand on its eastern side. A reef extends about three miles southward of Chala island, between which and the reef southward of it is the entrance to Chala bay.

Chala bay is situated westward of Chala point, and affords anchorage in smooth water during the north-east monsoon for four or five vessels. A good position is in 5 fathoms, with Chala island well open of Chala point, bearing E. by N. $\frac{1}{2}$ N., and with Gazi village bearing N. by E. There is a depth of 4 fathoms closer in, with Chala island bearing E. $\frac{3}{4}$ N. The village is situated at the mouth of the creek at the head of the bay.

The entrance to the bay is through a break in the reef fronting the coast, close southward of the reef, which extends about three miles

from Chala island. A well-defined saddle situated just northward of the bluff which forms the southern termination of the coast range, kept on the bearing of N.N.W., or some dark-coloured rocks bordering a sandy beach bearing N. by W. $\frac{1}{2}$ W., leads in southward of Chala reefs; when near the reefs fronting the shore, steer up the bay at a prudent distance from them. The least depth found on entering, at low water, was $4\frac{1}{2}$ fathoms.

As this bay has not been surveyed, considerable caution must be exercised when using these directions.*

COAST.—Aspect.—From Chala point to Ras Kibwesha or Reitz point, the south side of entrance to Mombaza, the coast is unbroken, but in lat. $4^{\circ} 16'$ S. projects a little; hereabouts is a conspicuous clump of trees, with a black cliff below them.* The whole of this coast is bordered by a reef, which at one mile southward of Reitz point, extends that distance off shore, and is named Andromache reef.

Chala plateau is the name given to the flat hills, about 2,500 feet in height, northward of Chala point, and extending for a distance of 18 miles northward. This plateau is somewhat abrupt on its northern side, but slopes gradually to the southward. There are several low ridges between it and the sea.

Coroa Mombaza, or the hummocks of Mombaza, are three low but remarkable hills situated about 5 miles northward of port Mombaza, and are most remarkable when seen from the eastward, as they then appear close together.

The land fronting them is from 40 to 60 feet high near the sea; and being about the same height as Mombaza island, the latter is not easily distinguished. In the background, distant about 8 miles from the coast, are the Emery or Rabai mountains, about 1,200 feet in height.†

Leven reef extends parallel to the coast between Mombaza and Matwapa river, at the distance of one mile. It is narrow and appears to be bold to seaward. Small craft use the channel between it and the coast as far north as Kuruitu.

Current.—A northerly current setting in about the line of the coast, may always be expected in this neighbourhood, running at the average rate of about one knot an hour during the north-east monsoon period, and 3 knots an hour during the south-west monsoon.

MOMBAZA ISLAND, the native name of which is Mvita, is about 3 miles in length north and south, and $1\frac{1}{2}$ miles in breadth, with a level surface, from 40 to 60 feet in height: the island is steep all round, in places perpendicular, with deep water generally close

* H.M.S. *Dragon*, 1886, and Berlin, Heft VII., 1886.

to. On the north side of the island the water is shallow, and there is a ford, passable at low water springs. Owen justly compares this island to a huge castle encircled by a moat.*

The town and fort of Mombaza are on the eastern side of the island. The fort is large and of quadrangular form, and built on a massive portion of rock elevated some feet above that which forms the surface of the island ; the rock is cut down so as to form a deep and broad moat, the masonry above rising as a continuance of the rock. The entrance projects over the moat, producing, with its sculptured stone work, an imposing effect : it is of more modern construction than the rest, having been built in 1635, in which year the other parts of the fort were renovated.

The town lying north of the fort is of the usual character and is the seat of a Wali of the Sultan of Zanzibar. Mombaza has recently become the head quarters of the British East African Co., and trade is likely to increase in consequence.

At Freretown, situated at the head of the port, is an important establishment of the Church Missionary Society, where many Africans of both sexes are educated.

Position.—The north-west corner of the fort at Mombaza is in lat. $4^{\circ} 4' S.$, long. $39^{\circ} 41' E.$

Port Mombaza, on the east side of Mombaza island, is $1\frac{1}{2}$ miles in length between its entrance and Kisaoni or Frere town, and about 2 cables in breadth, with good anchoring depths close to the shore on either side in most places. From the head of port Mombaza, a winding but deep channel communicates with port Tudor, into which the Barretté river discharges its waters. The entrance of port Mombaza is reduced to one cable in width between the 5-fathom lines, by the reef extending from the eastern shore below English point, and which does not show, but with due care the port is easy of access in either monsoon. During the north-east monsoon the sea breeze blows at E. by N., which allows any tolerably good sailing vessel to lay in. During the southerly monsoon the wind blows right in.

Leading Marks.—A small stone pillar, painted black and white, about 15 feet high; stands on Pillar point, the south-east point of Mombaza island, but it is difficult to see from seaward in the afternoon. A pillar has also been erected on Ras Kiberamini or Direction point, northward of the town.

* See Admiralty charts :—Chala point to Kwyhu bay, No. 1811 ; scale, $m = 0\cdot16$ inch ; and plan of Mombaza island and ports, No. 666 ; scale, $m = 1\cdot2$, and 3 $\frac{1}{2}$ inches. A new plan of Mombaza, by Commander T. Pullen, H.M.S. *Stork*, will shortly be published.

Outer Road.—The anchorage in the approach to Mombaza is between Leven reef head and the shallow rocky ground bordering the coast at the entrance of the port on the north-east, and Andromache reef and the foul ground off it on the south-west. This foul ground extends $1\frac{1}{2}$ miles eastward of Reitz point, with from 3 to 5 fathoms water, but in two places there is as little as 10 feet. There is also a 5-fathom rocky patch, of small extent, well outside the anchorage, with the pillar on west point of entrance bearing N.W. $\frac{1}{2}$ W., distant $1\frac{7}{8}$ miles.

The outer road is an indifferent anchorage at all times, the bottom being rocky and uneven, and during the southerly monsoon there is a considerable swell increasing the danger of the anchorage. The best place to bring up during the northerly monsoon is under the lee of the north-eastern reef, in about 7 fathoms, with the eastern extreme of the fort bearing N.W. $\frac{1}{2}$ N., and the south point of Mombaza island W. $\frac{1}{2}$ N.

Directions.—Mombaza is easily recognised by the break in the land ; the fort with its flagstaff is also conspicuous. From the southward, a vessel can follow along the Andromache reef at a prudent distance : the reef dries two or three feet at low water, for a distance of 3 or 4 miles and the sea breaks heavily on the shallow parts. From the northward, the Leven reef should be given a berth of three-quarters of a mile, the current considered, and a look-out kept for discoloured water.

To enter the outer road, or the port of Mombaza, steer for the flagstaff on a N.W. by N. bearing until the pillar on the south-east point of Mombaza is seen, then bring the pillar to bear N.W. $\frac{1}{2}$ W., and steer for it, anchoring if desirable in the outer road, as before mentioned. The pillar is not easily distinguished with the sun in the west ; there is an old battery close eastward of it.

To enter the port, keep the pillar on the same bearing, until the Mission house, with zinc roof, at Kisaoni town, is only just its breadth open eastward of the pillar on Kiberamini or Direction point, bearing N. $\frac{1}{3}$ W., then steer in on that mark, which leads half a cable or more eastward of the shoal off Pillar point, and about the same distance from the island, which is almost steep-to as far as the town. The entrance being only a cable wide between the 5-fathom lines, care should be taken in attending to the leading marks, as the tides run strong.

Ras Kiberamini or Direction point is the first point above the town on the west side ; it appears blended with the land at the back, slightly red, with a pillar on it, and black rocks lying at its extreme.

Anchorage.—Anchor in 11 or 12 fathoms water, in mid-channel, about one or $1\frac{1}{2}$ cables northward of English point, observing that a

flat extends $1\frac{1}{2}$ cables off the shore of the bight northward of the town, but the east shore is bold, and English point steep-to. This reach of the port is the most roomy, and very snug ; a large vessel should moor. The holding ground is good but the tides are strong at springs ; during the ebb when the sea breeze sets in strong, vessels swing broadside on between wind and tide. On the leading mark, abreast the north end of the main portion of the town, is a deep hole with 20 fathoms water.

Supplies.—Cattle and vegetables are to be obtained, and fowls and fruit are abundant.

Mombaza is not amply supplied with water, but from a well on the mainland, at about a quarter of a mile from the ferry, and 150 yards from the water's edge, about 4 tons of good water may be obtained in a day.

Winds.—During the north-east monsoon the sea breeze sets in daily at E. by N. about 10 a.m., and lasts fresh till sundown, when it hauls round and moderates to a light land wind at N. by E., which continues until the sea breeze comes in again. The land wind is generally steadiest about 7 or 8 a.m., which is therefore a suitable time for going out under sail. The southerly monsoon blows right in the entrance.

Tides.—It is high water, full and change, at 4h.; springs rise 11 feet, neaps $8\frac{1}{2}$ feet, equinoctial springs 15 feet. The ebb and flood run nearly equal times, and about $2\frac{1}{2}$ knots at springs. At the anchorage above English point the tide at neaps is scarcely perceptible.

PORT TUDOR is a land-locked harbour within Mombaza island, and is reached by a narrow winding channel on the east side of that island, which has depths of from 8 to 20 fathoms, and more in places with bold shores. There are few more beautiful places than this winding channel with its steep wooded banks.

The anchorage at port Tudor is in from 5 to 10 fathoms, mud, but there are extensive flats on both sides and in the middle of it. There appears to be no difficulty for a vessel, however large, to steam up to this harbour, but sailing is impracticable on account of the windings. Off the north end of Mombaza island a dry rock will be seen, which must be given a berth of three-quarters of a cable.

PORT KILINDINI, which means "in the deeps," is a fine sheltered harbour on the west side of Mombaza island, and leads to port Reitz; both these are in every way superior to Mombaza as a commercial port, the latter being scarcely available for long steamers, though there is ample water. Port Kilindini is about $2\frac{1}{2}$ miles long by half a mile wide, with depths varying from 6 to 20 fathoms, and as much as 30 fathoms at each end of this port, where it is narrow. The

bottom is rocky at the entrance, and also off Flora point at the west end of the port, but in other places sand and gravel, and in the upper half, mud. The shores are generally bold, but a 3-fathom bank projects about a quarter of a mile from shore between Ras Kilindini and the former village of the same name.

Shoals.—A shoal in mid-channel, 3 cables in extent, lies with its centre rather more than 2 cables from the west shore, and half a mile S. by W. from Ras Kilindini; two rocks dry near its west side and one near its north extreme; there is also a coral head, dry at low water springs, a little south-east of the middle shoal and nearly a quarter of a mile from the south shore. H.M.S. *Kingfisher* (1887) erected an iron beacon with diamond on this head, barely above high water springs; but it probably will not remain there any time. There is a depth of 6 fathoms within 10 yards of the coral head, all round it.

Directions.—To enter port Kilindini, steer for the pillar on the south-east point of Mombaza, bearing N.W. $\frac{1}{2}$ W., as for Mombaza, until the south-west point of the island bears West; then steer for the latter, and when about $1\frac{1}{2}$ cables from the island shore follow it along at that distance. A white-washed mark on the cliff, west of Reitz point, in line with beacon in rear of it (if in existence), bearing S.W. by W. $\frac{3}{4}$ W., also leads in mid-channel.

When Pillar point is shut in with the south point of Mombaza island, either shore may be approached at will as they are bold. Flora point N.N.W. $\frac{1}{2}$ W., or Ras Kibwesha (Reitz), touching Ras Serani, south point of Mombaza, astern, will be a fairway course between the central shoal and the reef extending southward of Ras Kilindini; or pass westward of the shoals by following the west shore at the distance of a cable or less.

Anchorage.—The best anchorage appears to be in 10 or 12 fathoms, about midway between Kilindini and Flora points, but vessels coming here for the purpose of watering may anchor more conveniently westward of central shoal, off the watering place.

The watering place is on the western shore 6 or 7 cables northward of Moueza or Kilindini creek; the water obtained here is very good but insufficient in quantity, not more than 2 tons being obtainable per day.

PORT REITZ is a fine inland harbour about 4 miles east and west by one mile broad, and may be entered without difficulty through port Kilindini which forms the channel to it. The western portion of port Reitz is much obstructed with shallows, but the eastern half has good anchorage in from 4 to 8 fathoms. The latter

depth will be found between Ras Ngari and Ras Myolini at one cable from the shore. Abreast this anchorage jetties could be constructed at little expense, alongside which vessels of any draught could lie. There is probably less water in port Reitz than is shown on the chart.

COAST.—The coast from Mombaza trends north-eastward 8 miles to Matwapa river, and is bordered by Leven reef, page 407.

Matwapa river is deep inside, but Owen's survey does not show what water can be carried through the break in the reef off the entrance to the river. The reef is said to continue from the north side of entrance along the coast to Kuruitu, situated 5 miles southward of Kilifi, and the channel inside it to be navigable for small craft.

KILIFI RIVER.—The approaches to Kilifi river, and Takaungu (formerly known as Kilifi), are from a survey by Commander T. Pullen, H.M. Surveying Vessel *Stork*, 1888. The observation spot at Narani, south side of the river, is in lat. $3^{\circ} 38' 25''$ S., long. $39^{\circ} 51' 3''$ E.*

The approaches to this river are fronted by North, Middle, and South reefs, extending about one mile from the land, and between which there are two main channels, known as Northern pass and Southern or Takaungu pass; Northern pass is the more direct for Kilifi. The reefs break during strong winds and occasionally during fine weather towards low water. Between South reef and the land there is a dhow channel, about half a mile wide, with depths of 3 to 4 fathoms on either side of a central patch which has $1\frac{1}{2}$ fathoms only in places; no marks can be given for it. Within North reef there is a boat channel leading to the northward.

The Northern pass, between Middle and North reefs, although only one cable wide between the 5-fathom lines, has a depth of 9 fathoms in mid-channel. Abreast the pass, on the mainland, is a white pillar 24 feet high, used as a leading mark.

The channel thence into Kilifi river is but one cable wide between the reef fronting the shore northward of the pillar, and the western side of the horn which extends about 8 cables southward from the point eastward of Kilifi town.

At one mile westward of the town, the river expands to one mile or more in width, forming a harbour, with depths varying from 6 to 12 fathoms near its entrance, to one to 2 fathoms at about three-quarters of a mile within, westward of which it nearly dries in

* See Admiralty plan of Kilifi river, with entrance enlarged, No. 238; scale, $m = 3$ inches.

† It is proposed shortly to erect a second pillar W. by N. of the present one; the two in line will form the leading mark for North channel.

places, but there is a boat channel to Kibokoni and Mtanganiko some distance up the river.

The Takaungu or Southern pass, situated between South and Middle reefs, is $1\frac{1}{2}$ cables wide between the five fathoms lines ; it is the most direct channel to Takaungu, the principal village.

Towns.—The village now known as Kilifi, stands on the north side of the entrance to the river, with a Custom-house and flagstaff near the extreme of the point. Narani village lies on the south side, westward of Kilifi.

Takaungu, formerly known as Kilifi, is situated on the south side of a creek $2\frac{1}{2}$ miles southward of Kilifi. The Wali of Takaungu is the Governor of the district. Takaungu creek is about half a cable in width, and almost dry at low water, but affords shelter to dhows, lying aground ; it shows as a gap in the land from seaward, but is not easily recognized until the fort opens out. The northern-most of three white sand patches is close to the entrance of this creek.

Supplies.—Sheep, goats, and fowls are to be obtained at Kilifi village. There is good water about half a mile at the back of the village.

DIRECTIONS.—Northern pass.—In approaching Kilifi river, the coast should be given a berth of $1\frac{1}{2}$ or 2 miles until abreast the Pillar, which may be seen from some distance, from which position, if desirable, a boat may be sent to Kilifi village for a pilot. There is temporary anchorage outside the reefs. It is not advisable to enter the river without a pilot, except under favourable circumstances, namely, at low water with the sun astern, at which time the reefs will generally be seen. To enter by the northern pass, bring the Pillar to bear W. by N., and steer for it until about 3 cables from the Pillar ; then bring the beacon eastward of Kilifi town in line with the whitewashed tree in front of it, bearing N. by W. $\frac{1}{4}$ W., which being steered for will lead in mid-channel until just within 4 cables of the south point of the river, when open the beacon eastward of the tree to avoid the reef extending off the south point ; (the reef fronting the shore can generally be distinguished). When the Peculiar tree point bears W. by N. $\frac{1}{4}$ N., steer for it ; this will lead clear of the south point of entrance reef, and of the bank extending one cable southward of the Custom-house.

Anchor westward of the Custom-house in about 12 fathoms, near the north bank of the river which is steep-to.

Takaungu or South pass.—To enter, bring Quoin hill in line with the inner point on south shore of the river, bearing W. by S. $\frac{1}{2}$ S., which mark leads midway between Middle and South reefs ; anchor when convenient. If proceeding to Kilifi river ; when the white

pillar on the coast bears N.N.W., steer N. by W. until abreast of it, when proceed as for North pass.

There is good anchorage in from 6 to 7 fathoms, within Middle and South reefs.

COAST.—**Owyombo river**, in lat. about $3^{\circ} 24'$ S., appears to be of some extent, and to have a bold shore near it with deep water. Southward, nearly to Kilifi, and northward as far as Melinda bank, the coast is apparently fronted by a reef to the distance of half a mile or more.

MELINDA ROAD, or port Melinda, is an anchorage in lat. about $3^{\circ} 16'$ S., with depths of from 5 to 10 fathoms, partly protected both northward and southward by reefs extending from the shore, and well sheltered from the eastward by Leopard reef, which extends $2\frac{1}{2}$ miles in a north and south direction, with a patch near its centre barely covered at high water, so that it may usually be distinguished for some distance. The outer edge of Leopard reef is about $2\frac{3}{4}$ miles from the shore; it was so called in consequence of H.M.S. *Leopard* narrowly escaping being lost on its north part. There appears to be convenient depths for anchoring outside the road, both to the northward and southward of Leopard reef.*

Melinda bank fronts cape Melinda, the southern approach to Melinda road, to the distance of $1\frac{1}{2}$ miles, and some dangerous outlying patches were seen from H.M.S. *Woodlark* in 1885. It should be given a wide berth.

Heavy overfalls were observed from the *Seagull*, with cape Melinda bearing N.N.W. distant about 6 miles. The vessel passed close on the east side of these overfalls (which appeared to extend a considerable distance towards the shore), but no bottom was obtained at a depth of 18 fathoms.*

Directions.—From the southward the position of Melinda road may be known by the Mangea mountains which lies westward of it, and on a nearer approach the high part of Leopard reef will be distinguished. From the northward, after passing Ras Gomani, the hill over the town of Mambrui, which is 200 feet high and crowned with trees, is a good landfall. The extremes of Leopard reef, and the reef northward of it, must be carefully avoided when entering the roadstead.

Tides.—It is high water full and change, in Melinda road, at 4h. 15m.; springs rise 11 feet.

MELINDA, situated 3 miles northward of Melinda road, derives its chief title to notice from the first voyage of Vasco da Gama, who

* See Admiralty plan:—Port Melinda, No. 667; scale, $m = 1\cdot5$ inch.

reached as far north as this place on his way to India in 1498. He describes the town as standing on a plain near the coast, surrounded with gardens, and consisting of houses neatly built of hewn stone, with handsome rooms and painted ceilings. It was at that time evidently a place of some importance. In 1605 the Portuguese, under Don Francisco d'Almeyde, took possession of the place. It is not known when and in what manner it was taken from the Portuguese ; but it seems that in the beginning of the last century it was in possession of the Arabs. Nor is it known in what manner it was lost by the Arabs ; but when Captain Vidal visited the place in 1824 he found that the territories of the ancient kingdom of Melinda were totally occupied by the Galla, a savage nation, which carried its conquests from the southern declivity of the Abyssinian Alps as far south as Melinda. On the site of the town Captain Vidal found nothing but ruins, and his opinion was that it was entirely destroyed by the Galla in their wars with the Arabs, who possessed most of the ports along this part of the coast. The town, which is of considerable size, with the country for a few miles around it, is now under the Sultan of Zanzibar.

Vasco da Gama's pillar, close southward of the town, is in about lat. $3^{\circ} 13'$ S., long. $40^{\circ} 10'$ E. It is 20 feet high, having a cross with the arms of Portugal on it at the top (very much weather worn), and is erected at the extremity of a narrow rocky promontory which serves as a pier to a small cove to the westward of the pillar, and which appears to have been the landing place of the ancient city of Melinda. The cove is open to the northward, and from the shallowness of the water, can never have been used except for boats. The promontory is about a quarter of a mile long by 150 yards wide ; it is perfectly flat at the top, and about 12 feet above the sea, covered with verdure and perforated by two natural archways.

Griffon bank.—A bank half a mile or more in extent, with a least known depth of $3\frac{1}{2}$ fathoms, and from 8 to 15 fathoms close seaward, was found by H.M.S. *Griffon* in 1889 ; the shoalest spot lies with Vasco da Gama pillar, bearing N. 53° W., distant $2\frac{1}{2}$ miles and nearly one mile northward of Leopard reef. The *Griffon* anchored on it.

Pillar bank, is an extensive coral bank fronting the coast between Melinda road and Melinda town. Off Vasco da Gama's pillar it extends to the distance of one mile, and breaks at high water on its north and north-east edges.

The patch of $1\frac{1}{2}$ fathoms, distant $1\frac{1}{2}$ miles N. by E. of the pillar, breaks at half tide, and with much swell on it breaks also at high water.

The anchorage off the town of Melinda is protected to the southward by Pillar bank, and affords good shelter during the south-west monsoon period, though some well sets in. It may be approached safely by keeping the flagstaff bearing about S.W. by W., the only danger being the small shoal of $1\frac{1}{2}$ fathoms, already referred to. The depths decrease gradually, but it is recommended not to go into less than 5 fathoms water. On approaching Melinda from seaward, the Mangea mountains will be first seen; then Mambrui hill and some light red patches of apparently perpendicular cliffs, northward of Melinda. On a nearer approach, the flagstaff and a white house on the beach will be distinguished. There is a considerable trade with Zanzibar and Maskat.

Supplies.—The surrounding country for miles is in a high state of cultivation. Small bullocks, sheep, fowls, and vegetables, are plentiful and moderate in price. There are wells of great depth and of ancient construction at Melinda, from which a plentiful supply of good water can be obtained.

Mambrui village is situated near a projecting point at about 6 miles northward of Melinda town. The hill, 200 feet high, over the town, is covered with trees, and makes a good landfall for Melinda.

Reef.—Off Mambrui the sea was observed to break heavily on a reef of considerable extent. This reef appeared to be about $1\frac{1}{2}$ to 2 miles from the shore, with Mambrui point bearing West.

Sabaki river lies between Melinda and Mambrui.

FORMOSA BAY is about 30 miles wide, between Ras Gomani and Ozi point, and about 14 miles deep. It appears to have convenient depths for anchoring in most places, but it has been only partially examined. There are several reefs in the western part of the bay, on which the sea breaks heavily at times, between 7 and 15 miles northward of Ras Gomani, extending some 6 miles from the shore. There are good boat passages within, with depths of 7 and 8 fathoms close seaward of them. Between these reefs and Kipini village, the soundings are said to be less than shown on the chart, and caution is necessary when standing into the bay.

Ras Gomani, in lat. $3^{\circ} 0' S.$, is a bold projecting peninsula visible at a distance of 20 miles, and forms the south-west extreme of Formosa bay. The bluff to the westward of the cape is very conspicuous, standing out white against the dark land, and visible on a clear day about 25 miles.

Anchorage.—In the bay formed to the northward of Ras Goman there is good shelter during the south-west monsoon in about 4 fathoms,

and the approach is clear ; but a considerable swell sets in at times rendering the anchorage not particularly good.*

Gomani river is about one mile wide at the entrance, abreast the village ; it is fronted by numerous sand banks, and the channel is not available for boats at low water. There is, however, a channel at half tide for boats by keeping close along shore before arriving at the bluff eastward of the river, and continuing so to the village at its mouth. A village stands on the left bank about 10 miles from its mouth, and about 12 feet water can be carried up. The breadth of the river over this distance ranges from about $1\frac{1}{2}$ cables to one mile, and the river is studded in places with thickly wooded islets, the banks being also densely covered with trees and jungle, with beautiful scenery.† The main entrance to this river seems to be southward of Ras Gomani.

Tana river.—The entrance to Tana river, which communicates with lake Schaggabau, lies near the middle of Formosa bay. So far as is known the bar is too shallow to permit boats to enter, with the ordinary amount of swell. The river runs parallel to the coast and less than half a mile distance for about 6 miles from its mouth, thence in a tortuous course to Tjara. Above Kau, on the Ozi, the Tana and Ozi are connected by a canal. See Ozi river, below.

Ozi point is the north-east extreme of Formosa bay. Detached patches, with $1\frac{1}{2}$ to 3 fathoms water, lie about one mile off the point southward of which are Ozi reefs.

Ozi reefs are two coral reefs, dry at low water, and from $2\frac{1}{2}$ to 4 miles in length, situated between 3 miles and $5\frac{1}{2}$ miles southward of Ozi point. Many rocky pinnacles from 2 to 20 feet high mark these reefs, which are apparently steep-to on the seaward sides. Shallow water is situated about 2 miles north-westward of the inner reef, and about the same distance off Ozi point.

Anchorage.—There is a good anchorage under Ozi point during the north-east monsoon period, but during the opposite season, though the reefs afford fair protection, the anchorage under Ras Gomani is far preferable.

The sea breaks heavily and right across at times in the passage between Ozi reefs and Ozi point ; it is, therefore, advisable not to attempt it, but to pass southward of the reefs.

Ozi river discharges into Formosa bay about 7 miles westward of Ozi point. The river is nearly one mile wide at its entrance, but it is faced by a dangerous quicksand bar, on which there is only 2 to 3

* See Admiralty chart :—Chala point to Kwyhu bay, No. 1811 ; scale, $m = 0\cdot16$ of an inch.

† Nav. Sub-Lieut. George Pirie, H.M.S. *Nimble*, 1871.

feet at low water. The bar is probably dangerous during the south-west monsoon period. Boats and small dhows can reach the mouth of the canal leading to Tjara. At the east point of entrance is Kipini village, and about 10 miles up the river is the town of Kau, with a population of 500. A few miles above Kau is the Belaso (a canal) which leads to the town of Tjara (now only a few huts) on the Tana river; this canal is usually navigable by boats or canoes; the trade of the neighbourhood passes through it and down the Ozi to the sea.* There are many large villages on the northern bank. Both banks are thickly wooded and the river is remarkably serpentine, scarcely any of the reaches being a quarter of a mile in length.

During the rainy season the river rises and inundates the surrounding country for many miles.

Fish are abundant ; and there are many alligators and hippopotami.

COAST.—From Ozi point the coast trends north-eastward for about 19 miles to Ras Tenewiati or Kanyika point, south extreme of Lamu bay. It has apparently a sandy foreshore backed by low hills, becoming gradually higher and undulating as Kanyika point is approached, which has a jagged appearance.

The south-west rocks and Kanyika islet front this coast at the distance of 2 miles ; no soundings appear on the chart, so that great caution must be exercised when approaching it.

South-west or Zewoyu rocks, are about one mile in extent in a north-east and south-west direction, and situated from 12 to 14 miles north-eastward of Ozi point and about 2 miles off shore. These rocks range from 30 to 50 feet high, and from seaward show as dark boulders against the coast, forming a good landmark. Westward of Kanyika islet they appear as one rock, and increase on different bearings to 13 in number, the latter appearing when the rocks bear N. by W.

The largest islet is near the north-east end, and from the south islet a ledge, just above water, extends to the southward for a quarter of a mile. *

LAMU BAY is 6 miles across between Ras Kitao the south-west point of Manda island, and Ras Tenewiati, the eastern extreme of Dongo Kundu, but is partially obstructed by sand banks, with from $1\frac{1}{2}$ to 4 fathoms water. In the south-west monsoon a swell sets in, but during the other season there is good shelter in

* Commander T. Pullen, H.M. Surveying Vessel *Stork*, 1889.

5 fathoms, west of the bar, and a vessel is nearer for communicating with the town than in Manda bay. Vessels whose draught will admit crossing the bar will find secure anchorage off Shella village.*

Kanyika islet, on the south-west side of the approach to the bay, is of bare coral, 25 feet high, and lies $2\frac{1}{3}$ miles from the shore of Dongo Kundu; if shut in with Dongu Kundu it is sometimes difficult to be seen.

Lamu island is about $6\frac{1}{2}$ miles in length; its south shore is all sand, and forms a gentle sweep inwards, backed by white sand hills partly covered with scrub, ranging from 30 to 250 feet high, the latter height being near the west end, whilst the hills over the village of Shella at the east end reach 175 feet. Within the hills, the island is low, flat, and much cultivated with cocoa-nuts.

Mlango Kipungani separates Lamu island from the mainland to the westward and affords a good channel for boats; as much as 9 feet water is reported throughout, but there is a considerable sea at low water at the entrance during the south-west monsoon, and it is impeded by a shallow bar on which the sea breaks in places.

Ras Kitao, the south-west extreme of Manda island, is low, and of rock bordered by shallow water, with bush behind it. **Ras Ukove**, the east extreme of Manda island, is of low rock backed by a hill 105 feet high. This point is difficult to make out after Ras Kilindini, to the northward, opens out.

Kitao knolls are coral shoals lying off Ras Kitao; the outermost patch with $2\frac{1}{4}$ fathoms water on it bears S.S.W., distant $3\frac{1}{2}$ miles from the western extreme of Ras Kitao. At one mile E.N.E. of this danger is Utende rock with $1\frac{1}{2}$ fathoms, on which the sea only breaks in the heaviest weather.

Seymour bank is an uneven bank of sand, with a least depth of 3 fathoms, which probably varies with the monsoons. Its north-east end is distant $1\frac{1}{2}$ miles from Ras Kitao, and its inner edge about 2 miles from the shore of Lamu island. Within the bank, the depths are 6 to 7 fathoms, gradually shoaling to the shore.

Anchorage.—There is sheltered anchorage in the north-east monsoon outside the bar, in Lamu bay, in 5 fathoms, sand, with the right extreme of Shella point N.E. $\frac{1}{4}$ E., and the right extreme of Ras Kitao E. by S.

* See Admiralty charts:—Lamu, Manda and Patta bays, No. 668; scale. m = 1 inch, also Nos. 669 and coast sheet, 1811.

Directions.—On approaching Lamu from the southward, the white sand hills on Dongo Kundu are conspicuous, but those on Lamu island are still more so, the whitest hill of all being the easternmost and at the entrance to Lamu harbour. Kanyika islet, when open of the land, is also a good landmark.

To enter the bay, bring the beacon-on the easternmost high peak of the Shella hills, in line with the red pillar on the point bearing N.N.E., and steer for them. This mark will lead in from seaward westward of Kitao knolls, and eastward of Seymour bank, in not less than 5 fathoms. When the right extreme of Manda island bears E. by N. $\frac{1}{2}$ N., then steer N. by W. $\frac{1}{2}$ W. between the bar and Seymour bank, to the anchorage.

LAMU is the most important town northward of Mombasa, and one of the largest in the dominion of the Sultan of Zanzibar. It stands on a slight eminence round a large fort, on the western side of the harbour, $1\frac{1}{4}$ miles within the village of Shella at the south-east point of the island. The Arab governor is supreme over the Zanzibar ports on this coast.

Population.—Trade.—The population is about 5,000, including Arabs and Suahelis. There is a trade in hides, orchilla, cowries, rafters, &c., and many dhows trade between Lamu and the coast of Arabia.

Supplies.—Bullocks, sheep, poultry, and vegetables are abundant also at times rice and dates.

Water is plentiful at the well under Lamo castle, but it is rather brackish; boats may be easily filled at high water without landing the casks, but at low water the casks would have to be rolled over a considerable sandy flat. Water, for boats cruising, may be obtained at the north end of Shella village, and excellent oysters from the rocks.

LAMU HARBOUR, called by the natives Amu (an arm), formed between Lamu and Manda islands, is long, comparatively narrow, and above Shella is much encumbered with shallow water, but it forms a secure anchorage for all vessels that can cross the bar. From comparison with the survey of Owen in 1825, the mangroves are evidently encroaching in many directions; the reef to the south-east of Lamu town is now crowned with a mangrove island, which increases in size every year. The shores at the northern end of the harbour are broken into mangrove creeks, one of which affords a boat passage at half tide to Manda bay.

The village of Shella is small, compact, and not seen from seaward, as it is hidden by sand hills, but a weather beaten and blackened minaret shows over the slope of the hills when bearing westward of North. There are several wells in the village, from one of which good water may be obtained.

Bar.—Lamu bar is formed between the reef bordering Ras Kitao and Diamond spit, a shallow bank running off in a southerly direction from Shella point. The eastern side of the bar is rocky, the western all sand ; on both sides the sea breaks at low water. The channel over the bar is straight, but narrow, and carries 17 feet at low water springs over a breadth of 160 yards. When abreast the western extreme of Ras Kitao the water deepens to 5 fathoms, which depth is carried up to the anchorage off Shella. The anchorage off Shella is more convenient than going farther up, as it is cooler and a more healthy position, and the harbour is only partially surveyed. There is often a considerable swell on the bar.*

Bar leading marks.—An octagonal pillar, 18 feet high, and painted red, is erected on the south extreme of Shella point. Also on the eastern of the Shella hills, 170 feet high, a spar beacon, surmounted by a black cask, has been erected ; these beacons kept in line lead over the bar.

Tides.—It is high water on Lamu bar, full and change, at 4 hours; springs rise 10 feet, neaps 7 feet, and neaps range $3\frac{1}{2}$ feet.

Directions.—To cross the bar, continue on the leading mark for entering the bay (the beacons in line bearing N.N.E.), over the bar until the small battery on the north part of Ras Kitao bears E. $\frac{3}{4}$ S., then steer in mid-channel and anchor off Shella village in 4 fathoms, sand and mud, with the minaret of Shella bearing N. $\frac{1}{2}$ W., and the small battery (in ruins) on Shella point, near the pillar, W. by N.

Do not enter at half flood, as the tide is then very strong ; in leaving proceed out with a rising tide ; near high water seems preferable.

Winds.—The north-east and south-west monsoons blow regularly along this coast, but close into the land the wind draws in during the

* The great difference found between Commander Wharton's survey of 1878 and that of Captain Owen of 1824, as well as of an examination made by Nav.-Lieut. Wood, of the *Diamond* in 1875, which differs from both, leads to a suspicion of change in the bar, but Commander Wharton was unable to find any confirmation of this from the local pilots and old inhabitants who declared it was the same always, the only difference being in the amount of sand visible at low water on Shella bank, which is greater in the south-west monsoon. Nevertheless, it would be prudent to anchor off the bar, and to send a boat to sound over the line of the leading mark before entering the harbour.

daytime, and a land wind prevails at night. In January the wind varies from N.E. to S.E., generally fresh, though at times light, and it is usually somewhat hazy.

Currents.—The northerly current off Lamu is stated to be uncertain in strength*, but this applies chiefly to the north-east monsoon period, when the northerly and southerly currents meet somewhere between Lamu and Castle point about 60 miles to the northward. The general northerly set, between Momboza and Lamu, is from 3 to 4 knots during south-west monsoon and one to 2 knots during north-east monsoon period.

MANDA BAY, at the entrance of a large mangrove-lined creek, that runs many miles inland, is a magnificent harbour with deep water and room for the largest ships, but the numerous reefs and shoals off the entrance, the velocity of the tides, and the want of accurate charts previous to 1878, prevented it from being much used.†

It is situated between Manda and Patta islands, and is connected with Lamu harbour by a passage, available for boats at half flood, northward of Manda island. For anchorage and directions, see p. 425.

The great creeks which extend inland from Manda bay have only been partially explored; they are not fed by any large river, and the navigation of them appears intricate. Siyu channel, on the north side of Patta island, connects Manda and Kwyhu bays.

Manda island, about 6 miles in length, separates Manda bay from Lamu harbour, and is now uninhabited, but the size of the stone remains attest the importance of the old town that flourished on its northern coast, in the time of the Portuguese.

The island has a few low hills along its seaface, the lower parts of which are also of sand, but of a much yellower hue than the hills of Lamu.

The coast of Manda island from Ras Kitao, at the entrance to Lamu harbour, forms a convex curve for 3 miles eastward to Ras Taka; these points are similar in character. Between the points and the off-lying shoals the depths are from 4 to 8 fathoms. Ras Ukove, the eastern point of Manda island, lies $3\frac{1}{4}$ miles from Ras Taka, the coast between is backed by low hills, averaging 100 feet in height, and which are conspicuous from seaward.

* H.M.S. *Kingfisher*, in June, 1885, on one occasion, found it running at the rate of 2 knots during the day, but through the night, without any apparent cause, increased to $3\frac{1}{2}$ knots; the British India vessels have also experienced this.

† See Admiralty charts:—Lamu, Manda, and Patta bays, No. 668; also No. 669, and coast sheet 1811.

Ras Ukove (Manda head) and Tawangu reef.—Ras Ukove is a low rocky point, fronted by Mwamba Tawangu reef, which stretches off $1\frac{1}{2}$ miles ; the sea breaks on its southern extremity.

Ras Kilindini, the north-east point of Manda island, distant $2\frac{1}{4}$ miles from Ras Ukove, is low and sandy, with some tall casuarina trees along its beach.

Manda Toto is an island mainly of mangroves, and stands on the north-east part of the reef extending from the shore between Ras Ukove and Ras Kilindini. The trees on it are about 35 feet high, fairly conspicuous, and the east shore of the island is rocky.

Position.—The north-east point of Manda Toto is in lat. $2^{\circ} 13' 35''$ S., long. $40^{\circ} 59' 40''$ E.

Patta island, forming the east side of Manda bay, is about 50 feet in height, nearly surrounded by mangroves, and with a central plateau of raised coral, principally cultivated with cocoa nuts. It is quite featureless, the tops of the trees, forming one uniform line, is all that is visible from seaward. The island has a large population, mostly inhabiting villages on its eastern end, where a considerable amount of ship (dhow) building is carried on. The town of Patti, or Pate, whose solid remains attest its former importance, is almost deserted, most probably on account of the creeks by which it is approached becoming entirely blocked up. The only approach to it now is from the eastward at spring tides, or by a swampy walk from the head of a small creek westward of the town.

The town of Siyu, situated near the centre of the island, is said to contain 5,000 inhabitants ; it is situated on a winding and intricate creek which leads into Siyu channel, and a boat would have considerable difficulty in finding it without native assistance. Paza, or Faza, about 4 miles farther eastward, is also up a creek leading from Siyu channel.

Siyu channel appears to have a least depth of 3 fathoms from Manda bay to abreast Siyu creek, thence towards Kwyhu bay but little is known of it.

The mangroves off the south-western end of Patti island have increased to an enormous extent since Owen's survey, and the clumps of these trees, then detached from the shore, are now all joined to the main island. Change may therefore be expected about Ras Changoni and the mangrove islands to the north-westward.

Chaka Mzungu, and the islets to the northward of it, are merely clumps of mangroves on Patti island reef they form a good mark for entering or leaving Manda bay.

MANDA ROAD is the space between Pesgrave and Vidal banks, and the shoals bordering the entrance to Manda bay. There are two entrances into the road ; one to the westward of Vidal bank, the other to the eastward and north of the bank.

Shoals in the approach.—**Presgrave bank** lies on the south-west side of the approach to Manda road, at about 2 miles from Manda island. It is about $2\frac{1}{2}$ miles in length, composed of coral, with general depths of 4 to 6 fathoms, but there are two patches of 3 fathoms.

Mchangamneni is a coral shoal, $1\frac{1}{2}$ miles in length, inside Presgrave bank, with depths of $1\frac{1}{2}$ to 4 fathoms.

Neither of these banks show in any way unless close to them.

Vidal bank lies on the east side of the southern approach to the road, and is about $3\frac{1}{2}$ miles in extent. The known depths are from $2\frac{1}{2}$ to 5 fathoms, but as the bottom is very uneven, there may be other shoal patches than those marked on the charts. On Vidal bank the water is always clear, but it does not otherwise show.

Mwamba Hanawi (Patta rock) is a coral reef awash at low water, situated $1\frac{1}{2}$ miles northward of Vidal bank ; it is surrounded by a considerable area of shallow water, and the sea generally breaks at all times of tide. The passage to the northward of Mwamba Hanawi between it and the shore reef is useless for navigation.

Mwamba Kwiyeye stretches 3 miles south-eastward from Ras Chongoni, the south extreme of Patti island, on the eastern side of the channel to Manda bay ; it dries in patches at low-water springs.

Pazarli rocks, about 35 feet high, are several large masses of coral lying on the eastern edge of Mwamba Kwiyeye ; they can generally be distinguished, and the easternmost is the highest.

Iwe-la-Manda is an isolated mass of coral, 25 feet high, on the western or channel side of Mwamba Kwiyeye, and at times is difficult to distinguish against the background of trees. From Iwe-la-Manda, a chain of flat rocks, which dry at half tide, extend in the direction of Manda Toto island nearly into the narrows.

Clark patch is a small knoll with $4\frac{1}{2}$ fathoms water, lying in the entrance channel to Manda bay, with Ras Uko bearing W. $\frac{1}{2}$ N., distant 2 miles.

Gordon reefs, with about 2 fathoms least water, are of coral and lie eastward of Clark patch, between the fairway and Mwamba Kwiyeye ; they do not show.

The sea breaks on the southern extremity of Tawangu reef, abreast Gordon reefs, but its eastern edge for $1\frac{1}{2}$ miles to the northward is not defined.

Farther in, the edges of the reefs on both sides are tolerably steep-to, and at low-water fairly defined, but too much confidence must not be placed in this, as the water at times is much discoloured.

The point of the sandbank extending northward from Manda Toto island is steep-to, but owing to the bubble of the sea caused by the tide it cannot be seen.

Entrance channels.—Muhaji channel between Presgrave and Vidal banks is $1\frac{3}{4}$ miles wide, and is used by vessels entering Manda road or bay from the southward. A ridge, with 6 fathoms water, connects the two banks.

Barracouta channel, between Vidal bank and Mwamba Hanawi, carries deep water throughout, and is the best passage for vessels coming from the northward.

Anchorage.—The best anchorage in Manda bay is off Kiindilin creek, in 6 fathoms water, with the left extreme of Manda Toto island S.E. $\frac{1}{2}$ S., and the sandy point at the entrance of the creek S.W. $\frac{1}{2}$ S.

There is good landing at the entrance of Kilindini creek, and the plains of Manda island at certain times of the year abound with partridges, antelope, &c.

Directions.—In approaching Manda road and bay, the white sand hills of Lamu, the lower hills of Manda island, and Pazarli rocks at the entrance to Patta bay, will identify the entrance. *See also views on chart.*

To enter by the Muhaji channel, bring the left extreme of Chindikasi islet on with the right extreme of Manda Toto island, bearing N. by W. $\frac{3}{4}$ W. (*see view A.*), and steer in on this line over the ridge with 6 fathoms water, connecting Pesgrave and Vidal banks; when the south-westernmost Pazarli islet bears N.N.E., steer for it (the ridge may also be crossed with this mark) until Mark islet is just open eastward of Chaka Mzungu islet, and seen between the other islets bearing N.N.W. $\frac{1}{2}$ W. (*see view D.*); steer in on this bearing, which will lead eastward of Clark bank, and to the narrows between Manda Toto and Mwamba Kwiyeye: when Iwe-la-Manda bears E. by S. $\frac{1}{2}$ S., steer W. by N. $\frac{1}{2}$ N. and anchor off the entrance to Kilindini creek.

Mark island and the adjacent islets appear from seaward as clumps of trees or mangrove bushes. Mark island is very small, and its

mangroves are extending westward, reducing the gap, and it is only to be distinguished between the bearing given as the leading mark and a position about half a mile eastward of the mark, but when seen is unmistakable.*

To enter by Barracouta channel, bring the beacon on Shella hills over the lowest part of a dip in the Manda hills bearing W. $\frac{1}{2}$ S. (see view C.), and steer in until Mark islet is open, when proceed as before stated.

Caution.—The velocity of the tides at springs in the narrow part of the channel to Manda bay is exceedingly rapid (4 knots or more), and at neaps considerable. The best time to enter is at low water, when most of the reefs are to be distinguished. No stranger should enter the channel on the flood. With adverse winds it is at times unsafe for boats. The time and height of tide are the same as at Lamu, page 421.

PATTA BAY is separated from the entrance to Manda bay by Mwamba Kwiyeye (Egava flat), which dries in patches at low water. The bay is about 4 miles in length, north-east and south-west, and fronted by Pazarli ridge, which is dry at low water. The entrance channels are at either end of this ridge.†

The shore of this bay is very low, and bordered with flats and shallow water to the distance of one to 2 miles, rendering landing difficult at low water. The depths near the reefs and in the channels to the bay are from 5 to 7 fathoms. The bay is little visited, as the villages on Patta island are more easily reached through Manda bay and Siyu channel. As Patta bay has not been re-surveyed, the chart and directions must be used with considerable caution.

Patta island is described on page 423.

Kizingati island, situated at the head of the bay, on the flat fronting Patta island, is 2 miles in length east and west. Its southern face presents a remarkable feature, being fronted by a barrier of rocks which is a little separated from the shore.

Patta cliffs are 2 miles eastward of Kizingati island, and Patta Middle cliffs are between the two. These cliffs are similar to the south coast of Kizingati.

Shoals in the approach.—The Pazarli rocks, 35 feet in height, which stand on the north-east extreme of Kwiyeye reef, and form

* Lieutenant H. Keane, H.M.S. *Kingfisher*, 1835.

† See Admiralty plans of Lamu, Manda, and Patta bays, No. 668; and Lamu Manda, Patta, and Kwyhu bays, No. 669, by Commander Wharton, H.M.S. *Fawn*, 1878.

the west point of entrance to Patta bay, are a good mark for approaching the entrance. See sketches on plan, No. 668.

South Middle bank lies about one mile eastward of Pazarli rocks, on the opposite side of South pass; it is about half a mile in extent, with a least depth, near its west end, of 3 fathoms.

Pazarli ridge extends about $1\frac{3}{4}$ miles in a north-east and south-west direction; some of the rocks near each end of the ridge uncover at first quarter ebb. From the western portion of Pazarli ridge a flat projects about three-quarters of a mile north-westward, near the extremity of which there is a one-fathom knoll.*

North Middle is a $3\frac{1}{2}$ -fathom patch situated about midway in the channel between Pazarli ridge and the south-west end of Siwi reef.

Siwi bank fronts the coast between Patta and Kwyhu bays and extends over a space of about 6 miles, leaving a passage for small craft between it and the shore. The northern part of the bank dries at low water, and shallow water extends in places a long mile outside the bank, particularly Siwi spit to the north-eastward. Sylph rocks, which cover at first quarter of the flood, are situated on Siwi bank, abreast and about $2\frac{1}{2}$ miles seaward of Patta cliffs.

Tides.—It is high water in Patta bay, full and change, at 4h. 30m.; springs rise 10 feet.

DIRECTIONS.—North pass.—Coming from the northward, Siwi reef may be approached to depths of 12 to 14 fathoms, keeping Kwyhu peak bearing northward of N.E. by N. until the western extremity of Patta cliffs opens to the southward of Siwi reef.

To enter Patta bay by North pass, steer in with the west extreme of Patta cliff bearing N.N.W. $\frac{1}{2}$ W., which will lead about midway between North Middle patch and Pazarli ridge; the latter is apparently steep-to, and probably always visible, as it dries at first quarter ebb. When inside the ridge, steer for the eastern cliffs of Kizingati island, until Ras Ukove, the eastern sand-hill of Manda island, is in line with Pazarli rocks, bearing S.W. by W.; then steer about W.S.W., and anchor as convenient.

South pass.—From the southward, a vessel may steer for the north-eastern Pazarli rock when bearing N.W. $\frac{1}{2}$ N.; when the east extreme of Kizingati island bears N. by W. $\frac{3}{4}$ W., steer for it; this mark should lead midway between the west end of Pazarli ridge,

* Owen.

which dries at first quarter ebb, and South Middle patch, when anchor as convenient. The channels are apparently easy of access at low water, when Pazarli ridge may be passed close to. There is a channel also westward of South Middle patch. Great caution must be taken when using these directions, which are partly written from an imperfect chart, as before mentioned.

In vessels whose draught will not admit crossing the Middle patches, boats might be placed to mark them before entering.

KWYHU BAY, situated between Patta and Kwyhu islands, is about 3 miles wide at its entrance, but a great part of it is obstructed by shoals, and all the north-western part of the bay which falls back upwards of 5 miles from the entrance between the reefs, is shallow. The northern part, into which a river empties itself, is named Fazy harbour.*

Kwyhu island, the southernmost of the Dundas islands, may be easily distinguished by its white sandy soil, spotted with verdure, and terminating in a low narrow point at its south-west extremity, beyond which there is Boteler ledge, always above water.

Kwyhu island with its conical peak 155 feet in height, and other rounded hills, and white sandy cliffs, is the most conspicuous part of this coast, and a good landmark for Kwyhu and Manda bays, when coming from the northward ; thence to port Durnford and as far north as Kiungamini island the land presents one uniform range of low hills from 40 to 60 feet high, mostly sand with slight scrub.

Kwyhu knoll, with 5 fathoms water, lies E. $\frac{3}{4}$ S. from Kwyhu peak, about $2\frac{1}{2}$ miles from the shore.

Boteler bank, situated nearly in the middle of the entrance to Kwyhu bay, is one mile in extent, with about $2\frac{1}{2}$ fathoms water.

Entrance channels.—In the southern channel, about three-quarters of a mile wide, between Boteler bank and Seewy spit, the depths are 6 to 8 fathoms, avoiding south-west patch, of 2 fathoms, which lies half a mile westward of Boteler bank. In the northern channel, which is better avoided, the depths are 4 fathoms between Boteler ledge and bank, with 2 coral patches of 3 fathoms nearly in mid-channel.

Directions. — Anchorage. — During the southerly monsoon vessels stopping only a short time will find the best anchorage in the south-west part of Kwyhu bay, under the lee of Siwi spit. Vessels

* See plan of Kwyhu bay, &c., No. 669.

should enter by the south channel. A good berth will be found in 6 fathoms, sand, with the east extreme of Fazy island N. by E. $\frac{1}{2}$ E.; Boteler ledge N.E. $\frac{1}{4}$ E.; and Siwi village N.W. by W. $\frac{3}{4}$ W. H.M.S. *Gorgon* anchored outside the reefs (apparently on a patch) in 8 fathoms, with Kwyhu peak N.N.E. $\frac{1}{4}$ E., and Siwi village N.W. by W. $\frac{1}{2}$ W.; but the ground is foul there, and the anchor and three lengths of cable were lost.

We have no information on Fazy harbour or port Boteler, which apparently afford good shelter for small craft.

The JUBA or DUNDAS ISLANDS extend from lat. $2^{\circ} 0'$ S. nearly to the equator, the coast trending north-eastward, nearly straight. The islands are generally narrow, having their length parallel with the coast, from which they are rarely distant more than $2\frac{1}{2}$ miles, and hence may sometimes be mistaken for the main land. The islands and rocks which are above high water amount to nearly 500, of which some measure from 2 to 5 miles in length, but the majority are of inconsiderable size and barren, rising abruptly from, and overhanging, a narrow line of reefs. These islands are for the most part connected by reefs, but have navigable passes here and there, thus forming secure and spacious anchorage for small vessels.*

Outside the islands a coral bank extends from 3 to 5 miles from the coast, with general depths of 7 to 25 fathoms, but there are 3-fathom coral patches here and there at 2 miles or more outside the islands, which render the approach to the coast somewhat dangerous for large vessels.

General remarks.—Considering the difficulties attending the navigation of this archipelago during the south-west monsoon period, it is a fortunate circumstance that if a vessel loses her anchors she may always from the direction of the wind lie clear off the shore. In the whole extent of these islands and rocks, a distance of 134 miles, there are but two known anchorages of any importance; namely, Kisimayu or Refuge bay, which was re-surveyed in 1879, and Port Durnford, where a vessel of moderate draught can usually enter at all times of tide; we have little information to give about the remainder of this coast. Vessels proceeding along it without requiring to touch anywhere, will avoid all danger by keeping off the bank of soundings, and those proceeding to any of the islands or ports must be guided by the chart and a careful look-out.

* The description of these islands and the adjacent coast, is chiefly from Owen See Admiralty chart:—Juba or Dundas islands (Kwyhu bay to Juba river), No. 670; scale, m = 0·5 inch.

Kiungamini island, (north end) in lat. $1^{\circ} 45' \frac{1}{2}$ S., long. $41^{\circ} 32'$ E., is about $1\frac{1}{2}$ miles in length, and similar in appearance to the other islands; the main land appears over them in two ranges of hills, moderately high, and regular. Rocks extend nearly three-quarters of a mile seaward of the southern part of Kiungamini. H.M.S. *Barracouta* anchored in 12 fathoms, abreast the village, with the north extreme of the island about N.W. by N., distant $1\frac{1}{2}$ miles. The bottom was a mixture of coral and mud.

The three Arlett hills, on the main abreast Simambaya island, about midway between Kwyhu bay and Kiungamini are apparently somewhat conspicuous when close in.

Dicks head, about 8 miles north-eastward of Kiungamini island, is a low rocky promontory with a slight elevation in the centre, on the south side of which there is a red sandy patch; the rocky face when seen from the eastward appears to have an opening or very narrow sandy cove in the centre. The islets to the south-westward are low, flat, and bluff.

Castle point, a bare islet in lat. $1^{\circ} 37'$ S., is remarkable, having, as its name implies, the appearance of a castle. There is a landing place on the south-west side in a small sandy cove.

Some white tombs are visible close to the beach at about one mile northward of Castle island.

Another islet, $3\frac{1}{2}$ miles north-eastward of Castle point, has still more the appearance of a castle, and is a mark well known to coasting craft. The islets lying close northward of it are low and flat, with bluff sides.

Current.—In the vicinity of Castle point, or between it and Lamu, during the north-east monsoon, the north-easterly and south-westerly currents generally meet and produce a current to the south-eastward; the limits of the place of meeting must, however, depend on the state of the monsoon and other circumstances, *see currents*, pages 25, 26, and 422.

Fair point or head, 5 miles north-eastward of Castle point, is a bold round-topped rocky hill over a sandy beach; it is the most conspicuous object, with the exception of Rozier hill, between Dicks head and port Durnford; when seen first from the southward it appears like an island.

Just southward of Fair point are some white sandy patches which at times show well from seaward; and just northward of Fair point are some hummocky rocks, 100 feet high, near the beach.

Sherwood point, 8 miles north-eastward of Castle point, is low

and rocky, with a hillock rising from a flat top ; the point is not conspicuous from the offing.

Rozier hill, about 10 miles south-westward of port Durnford is the best distant mark on this part of the coast ; it is flat-topped, with a bluff north side, and sloping south side, and shows above the coast range of hills.

To the southward of the hill in about lat. $1^{\circ} 23'$ S. is a hill on a projection of the land, which has a ridge of cliffs just below its summit ; it shows best when bearing N.W.

Rozier bank, $1\frac{1}{2}$ miles in extent, with 3 fathoms water, lies 2 miles from the shore abreast Rozier rocks.

Mount Barreti.—The coast between Rozier hill and mount Barreti becomes more barren, many sand patches showing along the low coast range. Mount Barreti, on the south side of the entrance to port Durnford, when seen from the southward, has a slight dip in its summit.

PORT DURNFORD (MTO BUBASHI) is a well sheltered harbour formed by the mouth of the river of that name ; within the bar there are anchorage depths suitable for all vessels, extending several miles. The country around the river seems capable of the highest cultivation, the soil varying from light red to a dark fine earth ; the banks of the river are high and wooded. Port Durnford has the appearance of a healthy place if any part of the east coast of Africa can be so called.*

In April 1875, the boats of the *Daphne* ascended the river for 20 miles, but only one village and one canoe were seen.

Foot point.—On the north-east side of the entrance, is the hilly peninsula of Burgal, the south-west extreme of which, Foot point, is in about lat. $1^{\circ} 13'$ S., long. $41^{\circ} 54'$ E. A ledge of rocks with a coral islet extends S.S.W. about 2 cables from Foot point.

Sand heads.—Nott sand head extends about 6 cables from the north-eastern shore at the same distance westward of Foot point ; Joyce sand head extends one mile from the west shore, or half the distance to Foot point. Both these sand heads dry at low water springs.

Bar.—The entrance is between Foot and Hood ledges, the latter being a ledge of rocks with 3 coral heads above water, situated near

* Owen. See Admiralty plan :—Port Durnford, No. 671 ; scale, $m = 1\frac{1}{2}$ inch, with sketch.

the extremity of Hood reefs which projects from the western shore. About one third of a mile within the ledges, and between the sand heads, is the bar, with a depth of $3\frac{1}{2}$ fathoms at low water springs. There is a 2-fathom patch nearly in mid-channel at about half a mile inside the bar;* it should be left on the starboard hand going in.

Directions.—Steer in between the ledges and over the bar on about a N.W. by W. $\frac{1}{2}$ W. course, until Henderson point, the farthest point seen on the western shore, is about to open of Deep water point; then steer for these points in line, bearing about N.N.W. $\frac{1}{4}$ W., which will lead southward of the 2-fathom knoll. When Joyce island bears West, a vessel will be past the knoll, and may steer in mid-channel.

During the southerly monsoon, it is probably difficult to get out of port Durnford in a sailing vessel, as the wind blows nearly in, and there is a heavy swell.

Tides.—It is high water, full and change, at port Durnford, at 4h. 45m.; springs rise 12 feet. The tides run strong.

Port Foot, between Foot point and Nott sand head, on the north side of entrance to Durnford river, is a snug little anchorage for small vessels during the north-east monsoon.

COAST.—**Port Johnes** is situated about 4 miles northward of port Durnford, on the north side of Burgal peninsula. The entrance is between the islets off the north-east end of that peninsula and Johnes island, and has $3\frac{1}{2}$ fathoms water; the head of the port is shallow; it is, however, a commodious harbour for coasting craft.†

Johnes or Tandraa island has a long sandy beach on its south-east side. The main land at the back of Johnes bay is thickly wooded with large trees. At 3 miles northward of Johnes island the coast range of hills suddenly drops into a plain which extends as far as Tula river.

Burgal shoal, of coral, with a depth of 2 fathoms lies E. by S., about one mile from Ras Burgal, or in the approach to port Johnes from the southward.

Darakas island, situated about $6\frac{1}{2}$ miles north-eastward of port Johnes, is hilly, and higher at the north end than the south. The east side of the southern hill is barren and sandy.

* As the survey dates as far back as 1824, the directions must be used with caution; see remark on chart.

† Owen.

Bluff hill is formed by a dip in the coast range behind Darakas, and is difficult to distinguish. Rising from the flat-topped range at about 2 miles southward of Bluff hill, there is a large square flat-topped rock which is conspicuous from seaward; in line with the south end of Darakas island it bears about West.

PORT TULA lies within Tula island and Vidal ledge, at about 13 miles north-eastward of port Durnford. The entrance is apparently about half a mile wide between the islets southward of Tula and Vidal ledge, with depths of 5 to 9 fathoms. Within the entrance the depths drop suddenly to 3 fathoms. The anchorage of port Tula is northward of Vidal ledge, in 3 fathoms water, gravel and sand, with the west extreme of Tula island bearing N.E. $\frac{1}{2}$ N., and the small rock off the south end of Tula islets E.S.E. There is also limited anchorage off the village on Tula island in 2 fathoms at low water. The tides here are strong.

The approach to Mto Umborini or Tula river is shallow with irregular soundings; a narrow channel leads to the river along by the north coast bank, but the sands shift. Within the river there are many Portuguese ruins, and the water is deep.

Tula island has numerous sand hills along its whole extent, and will be best known by a solitary palm tree near the north end. The village on the west side of the island is a place of resort for dhows, where they water on their way northward, during the south-west monsoon period.

COAST.—**Port Shamba**, situated about 10 miles north-eastward of port Tula, is formed by Tovai island, which lies nearly 3 miles from the main and off the entrance to Tovai river. There is a passage on either side of Zigadi island, but that to the northward has but 9 feet at low water, and the sea breaks right across during a moderate swell. The passage southward of Zagadi has a bank with only 3 fathoms water, rising abruptly in the centre with 6 and 8 fathoms, just within it; after passing the bank soundings of not less than 4 fathoms were obtained by H.M.S. *Vulture*. Between Zigadi and the islet to the westward there is deep water.

Port Shamba abounds in fish.

Tovai island is high, with barren sandy hills, the most conspicuous being near the south end, where there are several low rocky islets off a high sandy beach. The north point of this island is in lat. $0^{\circ} 51' S.$

H.M.S. *Vestal*, 1876, anchored in $7\frac{1}{2}$ fathoms, off Tovai island. distant about 7 miles, bearing not stated. A few heads with 6 fathoms

on them were found on this bank ; it is probable that other banks not marked on the chart may exist. The positions of the banks near the islands are generally indicated by the colour of the water, and should always be avoided.

Mto Tovai or Shamba river is deep within, but the bar between it and the port nearly dries at low water springs ; by the chart there appears to be a better passage to it from port Thenina.

Vuma or little Kwayama island, situated about 7 miles north-eastward of Tovai, rises gradually to the centre, where it is about 170 feet in height.

Thenina island, of a brown colour, lies between Tovai and Vuma, and is of less elevation than those. Port Thenina lies within Thenina island, but we have no information on the approaches to it. A wooded bluff on the mainland abreast Thenina is very conspicuous and a useful mark ; it is said to be visible from a distance of 16 miles.

Kwayama island, the north point of which is in lat. $0^{\circ} 37' S.$, is about 3 miles in length ; the eastern side is skirted by a reef which continues round the islets off its south extreme, and the village is on the north-west side. This island is the northernmost of the large and prominent islands of the Juba group, and therefore may be a useful mark for identifying the position of a vessel.

There is a passage on either side of Kwayama island leading into anchorages ; that to the southward, leading to port Kwayama, is between the island and Doubt rock, in from 4 to 6 fathoms, on either side apparently of a $2\frac{1}{2}$ fathoms patch lying in mid-channel. Doubt rock is stated to be foul to the distance of half a cable, and the channel to be only $1\frac{1}{2}$ cables in width. Within the pass is a spacious bay where vessels may anchor in from 4 to 5 fathoms, under Kwayama island, or westward of the rocky islets extending from the north point of Vuma.

Caution.—Great caution must be used in entering any of these anchorages with these directions and the existing chart, which is little more than a sketch.

The Shoals and reefs between Kwayama island and Kisimayu bay are classed by the Arabs under the name of Huma ul Hawaveen, and extends from 3 to 4 miles off-shore. They should be given a wide berth.

KISIMAYU BAY (Refuge bay) the northernmost anchorage on the east coast of Africa, which can be called a harbour, is better than any other at present known northward of Manda bay, and for

this reason will always be valuable as a port of refuge for vessels of war cruising on this part of the coast, but otherwise it will be of little importance until trade with the interior increases by way of Juba. There is sheltered anchorage at either end of the bay, according to the direction of the wind, though a considerable swell sets in at times.*

Village.—On the northern shore of the bay is a small Somali village of most indifferent huts, also a large white square Arab fort, which serves as the head quarters of a guard, and of the governor who represents the authority of the Sultan of Zanzibar.

Trade.—A small trade in hides and ghi passes through the village, but the actual trading place for this part of the coast is at the mouth of the Juba river, where there is a much larger settlement, of which Kisimayu is, to some extent, the port, the dangerous bar of the Juba river preventing much communication with the sea.

Aspect.—The land about Kisimayu is undulating and in no way remarkable, and haze often obscures it and renders identification of the few land-marks difficult. The soil is sandy and covered with grass, low bushes, and umbrella-like mimosa trees and scrub. To the northward of the Juba the coast appears much more sandy and bare than to the southward. The hills westward of Blankett point are not remarkable, but appear as an undulating ridge. Round hill only shows round when bearing southward of West, but at no time is it very conspicuous. Wooded peak is more serrated than the other eminences. At the mouth of the Juba is a rounded bluff with denser bush on it than elsewhere, which serves as a mark, though not a good one.

Murder hill, northward of Kisimayu, is a small conical eminence, no higher than the adjoining plateau, but it is separated on either side by a distinct dip, and is remarkable by its shape. The best view of it is on about a north-west bearing.

Islets and reefs.—Mtanga ya Papa, a flat-topped island, about 4 cables in extent, situated $1\frac{1}{2}$ miles north-eastward of Blankett point, the south extreme of Kisimayu bay, is 45 feet high, and covered with scrub; it is difficult to be seen in some lights, though with any haze it appears prominently forward. Green islet, 25 feet in height, lies 2 cables north-westward of it.

* See Admiralty plan of Kisimayu (Refuge) bay, with views, No. 860; scale, $m = 2$ inches. From survey and remarks by Commander Wharton, H.M.S. *Fawn*, 1878.

Nyuni or Smee rocks, 25 feet in height, and dome-shaped, lie near the edge of the foul-ground extending off Blankett point, and $1\frac{1}{2}$ miles southward of Mtanga ya Papa. South rock, 25 feet high, and several other islets, lie inshore of Nyuni.

Pillar rock, near the shore in the north-west part of the bay is a sail-like rock, 48 feet high, and generally shows dark against the land behind. It is an unmistakable mark, and at times can be seen from some distance outside.

Fred rock, with less than 6 feet water, lies in the approach to the south anchorage, with Pillar rock bearing N. $\frac{3}{4}$ E., distant $1\frac{4}{5}$ miles.

Fawatu islet, situated on the prolongation of the reef southward of Kisimayu island, is 13 feet high, with a well-built white beacon on it, used as a leading mark. A patch of $1\frac{1}{2}$ fathoms lies half a mile south-west of it, close southward of which is Inner Pass.

Kisimayu island, which forms a sheltered anchorage during the north-east monsoon period, is 85 feet high, and appears a reddish yellow compared with the land behind which is mostly green, with white sandy spots. There is a small dome-like projection at the south end of Kisimayu joined by a low rocky neck to the main island.

Position.—The neck of Kisimayu island is in lat. $0^{\circ} 23' 6''$ S., long. $42^{\circ} 33' 31''$ E.

Mear tomb islet, situated north-eastward of Kisimayu, is 40 feet high, and shows very green after rain; seen from the north-west it appears double, as there is a low dip in its centre. It is connected to Kisimayu by a rocky ledge, 2 miles in length, which breaks in places.

North Mears is a bare black looking rock, 28 feet high, standing on a rocky ledge which extends one mile northward of it.

Outer reefs.—The entrance to Kisimayu bay is barred by a succession of outer reefs and shoal patches; the outermost or Owen barrier being in the form of a narrow coral chain running parallel to the shore at a distance of about $2\frac{1}{2}$ miles, with depths of from $2\frac{1}{2}$ to 6 fathoms, and is apparently connected to the southward with the Huma-ul-Hawween reefs, but to the northward it terminates a short distance north-eastward of Kisimayu. South-westward of middle reef, which breaks heavily, the bottom is uneven and rocky. Dædalus knoll, of $2\frac{1}{2}$ fathoms, and Vulture patch, of $2\frac{3}{4}$ fathoms, lie on the barrier reef, north-eastward of Middle reef; the positions of these and similar patches will be seen by consulting the plan. There are

many openings through the barrier, but as there is always a heavy swell, not even the smallest vessel should risk passing through, unless the leading marks can be clearly seen.

Leading marks.—A white column stands on the northern shoulder of Mark hill,* and a white pillar on Fawatu island ; these, with Pillar rock, &c., form useful leading marks for the passes.

DIRECTIONS.—Caution.—The routes given below are the only passages closely sounded ; elsewhere there may be shoaler patches than those marked on the plan. The water is thick, especially during the north-east monsoon, when the water from the Juba river discolours the sea for some miles. Fawn pass (below) is the one recommended for vessels from the southward, in fine weather ; North channel (p. 439) for those from the northward, and from any other direction when there is much wind and sea, as it is wider than the other passes.

It must be borne in mind when entering Kisimayu bay, that the direction of the current in either monsoon will be on the beam, and a vessel should be steered well to windward, so as to maintain the line of the leading marks, until through the Inner pass.

Fawn pass leads over Owen barrier in $5\frac{1}{2}$ fathoms water, and north of the Middle reef in 5 fathoms, between it and close to a 4-fathom patch.

To enter, bring the white fort in Kisimayu village over the neck at the south end of Kisimayu island bearing N. by W. $\frac{1}{4}$ W., see view A on chart, and steer for it. This is an excellent mark and easily seen, but it must be closely adhered to, and any deviation on either side will be known by shutting in the fort.

It is recommended to bring the mark on at some distance outside Owen barrier, so as to observe the effect of the current before crossing the barrier. The current inside the barrier is frequently as strong as outside, but at times it slackens. If the current is strong and much difficulty is found in keeping the leading mark on, a vessel after passing Owen barrier, which will be known by the lead, can be kept to the northward and steered in with the mark for Knott pass, which leads well northward of Middle reef.

Continue on the above course, N. by W. $\frac{1}{4}$ W., until the pillar on Fawatu islet is in line with Pillar rock ; then alter course to W. by S. for the entrance of Inner pass, taking care to keep North Mear rock open of Kisimayu island until on the Inner pass leading mark.

Inner pass leads into the bay southward of the shoals extending

* Column reported not visible by H.M.S. *Mariner* in 1886.

from Fawatu islet, and between them and the north end of a bank, with depths of 3 to 5 fathoms, which stretches across the whole bay in the line of the islands. This pass must be used by whichever route a vessel has crossed Owen barrier.

To enter Inner pass, bring Pillar rock to bear N.N.W. $\frac{3}{4}$ W., (in line with the white column on Mark hill, if it exists) which leads through in $5\frac{1}{2}$ fathoms, to the centre of the bay.

Anchorages.—There is sheltered anchorage at either end of the bay according to the monsoon, but in both corners a long swell generally fetches home through the passage and over the shallows, which, as the vessel will be broadside on, causes her to roll. From $3\frac{1}{2}$ to 4 fathoms water, over sand and mud, will be the best berths at both anchorages.

If going to the north end of the bay, when Fawatu pillar bears N.E. by E. $\frac{1}{2}$ E., steer N.N.E. $\frac{1}{2}$ E. with the fort a little on the port bow, and anchor in $3\frac{1}{2}$ fathoms sand and mud, with the south extreme of Kisimayu island S.E. by E., and the port N. by E. $\frac{3}{4}$ E.

The south end of the bay is the best berth in the height of the southerly monsoon. To proceed to this anchorage, keep on the leading mark through Inner pass until the right extreme of Green island bears S.W. $\frac{1}{4}$ S., when four small islets or rocks will be open between the mainland about Blankett point and Green island (not counting Wills rock, which is close inshore and apparently barely clear of the point). Smyth islet, the northernmost and nearest of the four, just touching the north-west extreme of Green island, bearing S.W. southerly, will lead down eastward of Fred rock; when Nyuni islet is but twice its own breadth open of Mtanga ya Papa, steer West, and anchor in $3\frac{3}{4}$ fathoms, sand, with the north extremes of Mtanga ya Papa and Green island in one, and a piece of rocky cliff near Blankett point S.W. $\frac{3}{4}$ S.

Knott pass, at about $1\frac{1}{2}$ miles northward of Fawn pass, is also safe, and the depth of water in this route gives more room for any deviation that may occur from the direct line, but the marks are not nearly so good from outside the reefs as those for Fawn pass. Knott pass leads over the barrier in 5 fathoms water, and southward of the Dædalus knoll.

To enter by this pass, bring the white column on the north slope of Mark hill in line with the south end of Fawatu, N.W. $\frac{3}{4}$ W., and steer for it; (Pillar rock, open 2° southward of Fawatu, is the same line over the barrier) when Kisimayu fort is open of the hummock

at the south end of Kisimayu island, steer W. by S. for Inner pass, and proceed as before directed for Inner pass.

Zig Zag pass, the great natural entrance, has no leading marks and cannot therefore be used. Its proximity to the Dædalus knoll makes good marks a necessity.

North channel leads round the north end of Owen barrier, and is the nearest way in from the northward. With a heavy sea, much wind and current, this is the best passage for a large vessel, as the water is deep and there is abundance of room.

To enter by North channel, bring Mear tomb islet to bear W. $\frac{1}{2}$ N., and steer for it until Round hill is in line with the north extreme of Kisimayu island, bearing W. by S. $\frac{1}{2}$ S. ; keep this mark on (which also leads straight in from seaward if coming from the north) until Mear tomb bears N.N.W. ; then alter course to S.W. $\frac{1}{2}$ W. with Mtanga ya Papa right ahead, which will lead up to the entrance of the Inner pass; when proceed as before directed for Inner pass.

Outward route.—In leaving Kisimayu bay, there will be no difficulty in reversing the routes in. From the north end of the bay, bring Smyth islet, the northern and nearest of the four islets southward of Blankett point (as before mentioned, under anchorages) just touching the north-west extreme of Green island, which will lead down to the mark for Inner pass.

In going out by Inner pass, the helm can be put to starboard as soon as North Mear rock is well open eastward of Kisimayu island, and a course steered East to gain the marks for Fawn pass, or for a point eastward of Mear tomb islet if going out by North channel.

Supplies.—The water at Kisimayu is obtained from wells, and is scarce and bad. Bullocks, sheep, and goats can easily be procured, but no vegetables. Fish may be obtained with the sein at the beach fronting the village. At times large game is found close to Kisimayu, but Somalis roam in large numbers in the vicinity, and are not to be trusted.

Climate.—Fevers are said to be unknown. In the immediate vicinity of Kisimayu bay, there is a great dearth of vegetation, which, perhaps, may contribute to its healthiness ; but its salubrious character is by no means confined to the sand hills around ; for at the Juba river, where the land is excellent and vegetation abundant, it is also said to be free from fever.

The climate in the north-east monsoon period is far preferable to

that of Zanzibar, the nights being almost cool and the air at all times dry.

Tides.—It is high water, full and change, at Kisimayu bay, at 4h. 0m.; springs rise 10 feet, neaps 6 feet, neap range 2 feet. The tides however are variable and probably much affected by the winds and currents.

WINDS AND CURRENTS.—The alternate monsoons are strong in the neighbourhood of the Juba islands and Kisimayu, and carry the currents with them. From November to April the northerly winds prevail with a southerly current, being at its strongest, about 2 knots an hour, in January and February; during the other months of the year the winds and currents are reversed, the latter running from 3 to 4 knots north-eastward; their direction is nearly that of the trend of the coast. *See Currents, p. 444.*

Off Kisimayu, a portion of the south-westerly current passes inside Owen barrier and sweeps along the shores of the outlying islands.

MTO YA VUMBA or JUBA RIVER.—The mouth of the Juba is situated in about lat. $0^{\circ} 14' S.$, long. $42^{\circ} 39' E.$, about 10 miles northward of Kisimayu bay. The entrance is not easily seen as the points overlap, but the town is visible over the south point, from the anchorage; Murder hill (page 435) will also assist in identifying it. Within the bar the river is about 300 yards wide, with depths of about 10 feet, and it is said to be navigable for a considerable distance; its banks abound with large game.

The town of Juba or Vumba is about $1\frac{1}{2}$ miles within the entrance; it stands on a moderately high hill, is somewhat large, and surrounded by a clay wall 10 or 12 feet high. It is the centre of trade of this part of the coast, but owing to the dangerous bar of the river, most of the produce is taken to Kisimayu for shipment.

Bar.—The bar breaks heavily but apparently never dries; the natives state that they can wade across it in November. It is at all times dangerous, and during the greater part of the year impracticable, but during the months of April and May, and the latter part of September and October (at the change of the monsoons), by first anchoring near the bar at low water, and noting the best channel, it may possibly be taken at high water by steam cutters or whale boats.* The passage over the bar is somewhat across the prevailing

* At the time of the survey by the *Barracouta*, in 1824, they could neither enter the river, or effect a landing on the beach. H.M.S. *Leopard*, 1798, lost a lieutenant and the greater part of a boat's crew, who, after being swamped in crossing the bar, were all massacred but two, who were afterwards ransomed.

currents, which adds to the difficulty. The boats of the German vessels of war *Carola*, in January 1887, and of the *Gneisenau*, had to abandon the attempt to cross the bar, but it was successfully passed on two consecutive days in April 1887, by the steam cutter, and another cutter from the *Carola*, with depths at high water neaps, of from 5 to 10 feet, over an extent of about 600 yards, but this is scarcely the best water.

Anchorage.—The soundings decrease gradually from the offing towards the mouth of the Juba, to about 6 fathoms at half a mile from the bar, where anchorage may be taken with the flagstaff at the town bearing W. by N. $\frac{1}{2}$ N., but there is considerable swell here. This is probably a good position from which to watch the bar, otherwise deeper water is preferable.

Tides.—It is high water, full and change, at Juba river, about 4h. 30m., springs rise 9 to 10 feet.

CHAPTER XI.

THE EQUATOR TO RAS ASÍR.

VARIATION IN 1889.

| | | | | | | |
|--------------|---|---|---|---|---|--------------------|
| Meurka - | - | - | - | - | - | $6^{\circ} 0' W.$ |
| Ras Asswad - | - | - | - | - | - | $3^{\circ} 40' W.$ |
| Ras Asir - | - | - | - | - | - | $2^{\circ} 45' W.$ |

COAST.—From Juba river the coast trends north-eastward in a nearly straight line to Brava, about 117 miles. It is composed of reddish sand downs, covered here and there with stunted bush, and backed by high sand hills, most of which are bare and visible from a distance of about 25 miles. A high surf beats against the ledges which usually front the shore.

Between Juba river and the Red Sand hills, about 30 miles to the north-eastward, the depths are said to be only from 6 to 7 fathoms at 2 miles from the shore; H.M.S. *Wasp*, 1865, anchored in 16 fathoms, within half a mile of a coral reef estimated to be from $1\frac{1}{2}$ to 2 miles from the coast, at about 40 miles southward of Brava, this places it between Jua and Cascara. In most places the coast may be approached with safety, to depths 9 or 10 fathoms, which will be found about one mile off.*

Large herds of cattle are seen at times along the coast.

BRAVA is situated in lat. $1^{\circ} 6\frac{1}{4}' N.$, long. $44^{\circ} 3\frac{1}{2}' E.$, is built on an eminence of about 100 feet high, close to the beach, and owes allegiance to the Sultan of Zanzibar. The natives of Brava, a warlike and almost independent tribe, are friendly now, though they were not so some years ago.

The land at the back of the town is high, has a reddish appearance, and is spotted with dark clumps of brushwood. Both northward and southward of the town is a bare white hill; the northern, named Dhauw, by the natives, is the higher of the two. The tower

* See Admiralty chart:—Delagoa bay to Ras Asir (Guardafui), No. 597.

on Manara islet, about 50 feet in height, and 60 feet above high water, at $1\frac{1}{2}$ miles southward of the town shows out well against the white mountain behind it, and is a good landmark, being visible about 10 miles under favourable circumstances.

Barretté islet, 36 feet in height at its south end, on which there is some vegetation, and other islets and rocks front the town at a short distance from the beach, but notwithstanding the shelter they afford, dry landing is generally difficult.

The roadstead off the town is open and exposed, with generally a heavy swell, even in fine weather.

Native craft lie sheltered within Barretté islet.*

Trade.—The exports consist of hides, orchilla weed, sesame, gum, ghi, and earthern pots ; the latter, in large quantities, are distributed along the coast by local traders. Most of the products are taken to Zanzibar by dhows, and the months for trading are from November to April ; then the wind is light easterly during the day, with a land breeze at night. The imports are cotton goods, iron, sugar, molasses, and dates. Loading is carried on with boats, the planks of which are fastened together with fibre, which renders them very pliable and adapted to the surf.

Supplies.—Cattle and other supplies in small quantities can be obtained.

Water may be obtained in fair quantities : the best place for watering is about 2 cables to the northward of Manara tower ; the water here, although of a slightly brackish taste, is good for use. Brava is the last watering place for dhows when proceeding northward.

Climate.—The climate of Brava is reported healthy.

Anchorage.—The bank of soundings off Brava is distinctly marked by the change in the colour of the water, the deep ocean blue suddenly changing to green, and farther in shore as suddenly to dirty yellow.

During the south-west monsoon period, good anchorage may be obtained in 6 to 7 fathoms water, with Barretté islet in line with Manara tower bearing S.W. $\frac{1}{2}$ W., and the Government building in Brava, marked by a flagstaff, W. by N. $\frac{1}{2}$ N. The occasional trading vessels from Europe lie here, it being the most convenient place for discharging cargo. Two or three yearly visit Brava. In approaching

* See Admiralty plan of Brava, No. 672 ; scale, $m = 2\frac{9}{10}$ inches ; but too much dependence must not be placed on its accuracy.

this position, care must be taken to avoid the position of a breaker reported to lie half a mile north-eastward of Barretté island in line with Manara tower. Manara tower well open eastward of the islet will lead clear of the assigned position, but its existence is somewhat doubtful.

H.M.S. *Daphne* anchored in August, in $12\frac{1}{2}$ fathoms, with Manara tower bearing W. $\frac{1}{2}$ N., and the east extreme of Barretté rocks N.N.E. $\frac{1}{2}$ E. At that time it was a wild anchorage, the ship rolled 20 degrees, and the current prevented her lying head to the swell, but the holding ground was considered good, though a second anchor is recommended to be dropped under foot. The edge of the green water appeared about a quarter of a mile outside the ship. The edge of the yellow muddy water was at times outside and at times inside the line of her anchorage. This anchorage is not recommended in the south-west monsoon period.

During the north-east monsoon a vessel may anchor half a mile south-westward of Manara tower, and be better sheltered than in the anchorage between the tower and Barretté islet, just referred to.

Vessels of 7 to 9 feet draught can enter the dhow anchorage, westward of Barretté islet, where there is good shelter. The southern entrance is always available, but the northern has little depth at low water.

Tides.—It is high water at Brava, full and change, at 4h. 10m.; springs rise 8 feet. The current in the road follows the direction of the coast, running N.E. or S.W., according to the monsoon, with variable strength. The northerly set is least felt at low water, and is at its maximum at high water, running at times from 3 to 4 knots per hour.

Current.—Nav. Lieut. H. E. Wood, H.M.S. *Diamond*, 1876, writes :—On the night of the 8th December, the ship was set during the night whilst hove to, 36 miles W. $\frac{1}{2}$ N. nearly direct on to the land, which at daylight was distant only 5 or 6 miles; it was then almost calm, and the ship drifting W.N.W. towards the shore, at the rate of 2 miles an hour. Steam had to be got up. The current which affected the vessel after daylight was apparently a surface current, as the line on the in-shore side of the ship, after the lead had descended 4 or 5 fathoms, led directly under the bottom. As the ship neared the shore the drift appeared to turn more to the southward, and close in would probably have been to the south-west parallel to the coast. The part of the coast was in $1^{\circ} 20'$ N., or about 22 miles north-east of Brava, and is apparently clear of danger, there being no bottom with 50 fathoms, 3 and 4 miles off-shore. See Currents, p. 440.

COAST.—From Brava the coast extends north-eastward, about 96 miles to Magadoxa; it is generally bold of approach to the distance of one mile, sterile, sandy, and destitute of trees, with a few rocks near the shore in some places. From Dai, situated about 18 miles northward of Brava the coast hills are over-grown with a stunted bush, but towards Muerka they resume their usual sterile appearance.

The road to Muerka from Brava follows the coast, and numerous strings of camels and herds of cattle are to be seen on it.

The breaking patch, charted about 7 miles north-eastward of Brava, lies about $1\frac{1}{2}$ miles off shore, and apparently dries about 6 feet at low water.

H.M.S. *Columbine* anchored in 8 fathoms, fine dark sand, $1\frac{1}{2}$ miles off the point, 10 miles northward of Brava, and about 3 miles northward of the patch of rocks just referred to. The point projects in a south-west direction for about half a mile, but affords no shelter, not even for landing. The ship rode easily with 50 fathoms of cable, though the heavy swell caused her to roll much. The junction of the blue and shallow water is most remarkable. Between Brava and this point the land falls back, forming a deep bay, in which there are several dangerous rocky patches, some extending as far as $3\frac{1}{2}$ miles from the shore.*

The coast should not be approached within the depth of 20 fathoms. Along this part of the coast there are several villages, but the only places which keep up any communication with the interior are Brava, Meurka, and Magadoxa. The hills about Muerka are about 300 feet in height; a small mosque or tomb stands on the point about 2 miles south-westward of Muerka.

Torre.—The town of Torre (Terra), about 35 miles north-eastward of Brava, is a compact village of huts near the coast on a sloping headland, between a widely-extended patch of red sand to the north, and a smaller patch of white sand to the south. It may be further known by a hill of red sand and brushwood to the southward, by a long patch of black rocks on the beach about 30 feet high, and by a remarkable horse-shoe shaped gap at the north end of the town. The town is of moderate size, and surrounded by a wall which encloses it on the land side. There is a depth of 8 fathoms water, at half a mile off the point of the headland, and south-westward of the point there is a detached dry rock; it is probable there would be fair landing here in the N.E. monsoon.*

* See Admiralty chart, No. 597.

Munguia is a straggling village of huts, at about 20 miles north-eastward of Torre, and would not be seen from a vessel unless close in. From Torre to Munguia the shore is fringed by a reef nearly all the way, inside which is smooth water, but apparently shallow.*

MEURKA or **Marka** is a large walled town of a far more imposing appearance than either Brava or Magadoxa, with a considerable trade in hides, ivory, and gum copal. It owes allegiance to the Sultan of Zanzibar. Its south point is situated in lat. $1^{\circ} 42' N.$, long. $44^{\circ} 54' E.$ †

Shallow water, with patches from nearly dry to one fathom at low water, extend from 3 to 5 cables off shore, and detached patches of about 3 fathoms lie three-quarters of a mile off ; the outermost of these lies E.S.E. about 9 cables from the south extreme of the town : outside and to the southward of these patches the water deepens rapidly. Southward of the town the shore should not be approached nearer than three-quarters of a mile.

Supplies.—Sheep, fowls, eggs, and water can be obtained : wood is scarce.

The anchorage is unsheltered, and much contracted in space, owing to the steepness of the bank. Large vessels may anchor in 15 fathoms, sand and coral, with the town bearing N.W. by W. about one mile distant ; communication with the shore is difficult. There is anchorage closer in, in about 8 fathoms, with the governor's flagstaff bearing North, distant about 6 cables, and the house, one mile southward of the town bearing West, but the water shoals to 4 fathoms at half a cable nearer the shore.

There is a dhow anchorage close south-westward of the town, the entrance of which has 3 to 4 fathoms between the reefs ; here they lie sheltered by the reef at low water, but at high water the swell rolls in over the reef without breaking, causing a heavy surf on the beach ; landing is then frequently impracticable. In November, when the monsoon changes and north-easterly winds prevail, a vessel of light draught can lie at the dhow anchorage ; the expense of loading will then be less.

Tides.—The tides and currents off Meurka are similar to Brava, page .

* Nav. Lieut. Nankivell.

† See Admiralty plan of Meurka anchorage, with view, No. 671 ; scale $\frac{1}{2}$ inches.

MAGADOXA, pronounced Magadoza, otherwise called Mug-deesha by the natives, may be observed from a considerable distance when approached from either direction, as it stands about 40 feet above the sandy plain. Five towns or villages lie between Meurka and Magadoxa, of somewhat imposing appearance from a distance, but on a nearer approach they are found to be dilapidated and but thinly inhabited.

The town of Magadoxa is divided into two distinct parts.

The south-western portion is called Hamarwin by the natives, and has about 150 stone houses ; it was originally the Portuguese settlement, but a few inscriptions only remain to denote its former proprietors. This portion of the town, when seen from seaward, has quite as imposing an appearance as the more modern and eastern one of Shangani, but it is quite deserted and falling into ruins. Formerly there were two towers : the northern one, which stood on an eminence, has been down for many years ; the southern one may be still standing in the midst of Magadoxa, but it is not conspicuous. Its position is lat. $2^{\circ} 1\frac{3}{4}'$ N., long. $45^{\circ} 24\frac{3}{4}'$ E.*

Like most Somali towns, there appears to be no chief at Magadoxa whose authority is at all absolute, and the natives, although friendly enough as regards commerce, do not seem to be sure enough of one another to advise a European to land without suitable escort. The town and the district for miles around it is under the Sultan of Zanzibar. The chiefs of the Somalis, beyond the limit, are subject to the authority of the Sultan in the interior, who resides about 30 or 40 miles from Meurka.

The old disused lighthouse, which appears as a sort of beacon, is of considerable elevation, and stands isolated on the beach close to the water, at a short mile north-east of the tower of Magadoxa ; a white sandy background renders the tower conspicuous at a distance, and especially on a clear night.

A large white house like a palace stands westward of the new town, and can be seen for many miles ; and a white turret stands in the centre of Shangani town. On the beach there are a great number of large boulders.

Anchorage.—The roadstead is open and exposed : vessels may anchor in from 11 to 14 fathoms water, fine sand, with Magadoxa town bearing from W. by N. $\frac{1}{2}$ N. to N.W. by N., about three-quarters of a mile outside the reef. The port or dhow harbour can accommo-

* See Admiralty plan of Magadoxa, No. 672 ; scale, m = 2·5 inches.

date 12 to 16 dhows in all weathers, and is formed by a narrow reef parallel to the shore, and distant from it about a quarter of a mile : this reef extends from abreast the town, eastward upwards of 3 miles, and the sea always breaks on it. The harbour within it has from 6 to 12 feet at low water springs, with 2 fathoms in the entrance between the west end of the reef and the reef projecting from the shore abreast the town. There is good landing in the harbour, but the entrance may probably be dangerous for boats during fresh southerly winds.

Supplies.—Fresh beef, sheep, and goats are plentiful and cheap, the sheep being of excellent quality : other supplies are also to be obtained, but no water for shipping can be procured in sufficient quantity. There are two watering places : one to the west of the towns, and the other, which is the best, close to the old light tower, but the water at both is brackish, and has to be scooped out of the sand.

Trade.—Most of the Arab dhows visit this place in their coast navigation to exchange sugar, molasses, dates, salt fish, and arms, for ivory, hides, gums, and home-spun cloth. November to April are the trading months, being the fine weather period.

Tides.—It is high water at Magadoxa, full and change, at 4h. 30m. ; springs rise 8 feet.

Current.—The south-westerly current commences at Magadoxa almost invariably with bad weather from the N.E. about the second week in December ; it sets in the same direction at a distance from the land nearly a month earlier. It does not last above three months.

Off Magadoxa, in August, the current has been found to set about 3 miles an hour to the north-east, nearly parallel but inclining towards the shore. When hove to with the vessel's head to seaward, the shore has been neared, and it has been necessary to stand off for an hour or two. On the 20th August the current is recorded N. 48° E. 82 miles per day.*

In the route to the southward, between the coast ports, during south-west monsoon period, Nav. Lieut. E. Nankivell, 1873, remarks :—I believe that except when the monsoon is at its height, and perhaps even then, that a moderate-powered steam-vessel by anchoring at night, and closely following the coast by day, would always be able to get to the south-ward. The winds and currents are so very variable in strength and direction, that it is at best a doubtful experiment to try to get to the

* H.M.S. *Lyra*, 1865.

southward by standing offshore; on the other hand, the inshore passage requires the most unremitting attention, and is most harassing work. See remarks on winds and current, pages 440 and 25.

COAST.—About 12 miles northward of Magadoxa a chain of hills commences, and extends some miles to the north-eastward: about this part of the coast there are two or three bays with white sand-hills. The soundings decrease suddenly from 40 to 10, 5, and 3 fathoms, and a wide berth should be given to this part of the coast, which is in general sandy, sterile, and rather low.*

At about 15 miles north-eastward of Magadoxa is the south extreme of a line of reefs about 20 miles in length (excluding Warsheik bank), and extending parallel to the coast at a distance of 4 or 5 miles. Abreast the centre of the reef, and inshore of it, is an island, or what appears like one, of black rock, of about the height of Warsheik, on which is an Arab village.

WARSHEIK lies about half a mile to the westward of Ruin point, and appears to be a thriving and well-populated village. It is visible from a distance of 12 miles; some lofty stone houses on Ruin point give it the appearance of a fortress.

Position.—Ruin point is in about lat. $2^{\circ} 19\frac{1}{4}'$ N., long. $45^{\circ} 54'$ E.†

Dhow harbour.—Pyramid islet.—A ledge of rocks extends about 2 cables in a W. by S. $\frac{1}{2}$ S. direction from Ruin point, near the extremity of which is Pyramid isle, a small flat-topped islet with steep sides, and the base of a small pyramid or beacon on it. This ledge of rocks between Pyramid isle and Ruin point is awash: one small piece of rock, like a boat under sail, being visible at a distance. The ledge, together with a rocky spit with from 9 to 12 feet water, which extends nearly 3 cables S.S.W. $\frac{1}{2}$ W. from Pyramid isle, forms a dhow harbour which is completely protected from all but S.W. winds; in November it is usually filled by dhows from Arabia loading with orchilla weed, of which there is a great quantity in the neighbourhood, for Zanzibar.

When the wind comes in strong there is much sea, and the entrance of the harbour is impracticable for boats. There is a depth of $2\frac{1}{2}$ fathoms in the harbour, but this depth is not of great extent, and to the northward of Pyramid isle, near the ledge of rocks which form the harbour, there is only a few feet.

Warsheik or Ducouedic bank lies in the approach to Warsheik road; it extends parallel to the coast and distant about 2 miles,

* See Admiralty chart, No. 597.

† See Admiralty plan of Warsheik on sheet of plans, No. 671; scale m = 1·7 inches.

with depths of 3 to 5 fathoms, sand and broken shells, over its western end. Its western extreme lies with Pyramid islet bearing N.N.W., distant $1\frac{1}{2}$ miles; its extent eastward has not been determined, and as there may probably be less water, a wide berth should be given to it. It appears to be steep-to near its south-west extreme, but to deepen gradually from 3 to 8 fathoms farther north-eastward.

Westward of this bank is a reef, which H.M.S. *Leven* in 1825 coasted, from a quarter to half a mile distant, for 18 or 20 miles, getting no bottom at 40 fathoms.

The anchorage off Warsheik is between Warsheik bank and the village, in 16 fathoms, gray sand, good holding ground, with Pyramid islet bearing North, distant half a mile. The same bearing of Pyramid islet leads in from seaward, westward of Warsheik bank. The spit extending 3 cables south-south-westward of the islet must be guarded against. H.M.S. *Teazer* anchored here in November, at which time the wind was E. by N. and blew strong with rain, which raised a considerable sea and swell, but not sufficient to prevent communication with the dhow harbour. It is, however, an exposed anchorage.

Tides.—It is high water at Warsheik, full and change, at about 4h. 30m.; springs rise about 8 feet. The current generally follows the direction of the coast, according to the prevailing monsoon; its velocity is variable, sometimes reaching 2 or 3 knots.*

Supplies of live stock to a limited extent are to be had, with some difficulty, as they are brought from three or four days' journey in the interior. Water is scarce and bad. It is advisable not to go far from the boat, though the natives appear well disposed. Fish appear to be readily caught off this coast by towing a line astern.

Warsheik point, situated about 15 miles north-eastward of Warsheik village, is fronted by a reef which extends north-eastward along the coast, attaining off the next point a distance of 3 miles from the coast. South-west of Warsheik point the coast is skirted by rocky ledges for about 9 miles.

Murot hill is situated apparently about 10 miles north-eastward of Warsheik point.

TERNATE SHOAL, in lat. about $3^{\circ} 15'$ N., projects about 2 or 3 miles from a low point of land, which is otherwise destitute of any distinguishing marks. The ship *Ternate* nearly ran upon this shoal, having had 18 and 20 fathoms close outside it, and not observing it until the sea was seen to break.†

* French Survey, 1848.

† Captain Smee, 1811.

Daphne shoal, of 4 fathoms, lies in about lat. $3^{\circ} 56'$ N., and 4 miles from the shore; the weather being unfavourable, an accurate determination was not obtainable.

The least water obtained was 4 fathoms (low water), but as there was only time to pull across the shoal once, there may be less. Between the shoal and the mainland soundings of 11 fathoms were obtained, and 9 fathoms at $2\frac{1}{2}$ cables from the beach.

A dhow lay at anchor near the shore trading with the natives who had erected temporary huts; they called the place Sharoti.*

The COAST between Ternate shoal and Ras Asswad is generally low and clear of danger.

Ras Aswad, or Black point, in about lat. $4^{\circ} 30'$ N., is a point of low black cliffs projecting from the sand hills over the beach into the sea. The land is low near it to the southward, but the elevated land to the northward may be seen at the distance of nearly 30 miles. This part of the coast is called by the Arabs Al Herab or the mountainous country.† There are depths, which extend 2 miles off, of 20 to 30 fathoms along this portion of the coast.

Ras Awath, in lat. $5^{\circ} 30'$ N., is a projecting sand down, with rocky cliffs in front of it, and a reef extending 2 miles off; this reef has a depth of 10 fathoms close-to. The coast between it and Ras Asswad forms a slight bend, and has depths of from 20 to 40 fathoms at from 6 to 9 miles off.†

From Ras Awath some hills extend a short distance to the northward, thence the coast becomes low, with sand hills in places. The German vessel-of-war *Hyane*, 1887, anchored off the coast, known as Al Bugh, in lat. $5^{\circ} 55'$ N., in 10 fathoms water, but could not effect a landing. The coast between lat. 6° and 7° N. continues low and steep, but is fertile, and numerous flocks of sheep, goats, and herds of camel were seen. Northward of lat. 7° N. it becomes high and rocky, with a deserted aspect, to Ras al Khyle. This coast, from Ras Awath, called by the Arabs Sef Tweel, has depths of 10 to 18 fathoms at several miles from it, and 25 to 40 fathoms at from 9 to 10 miles distant.

Obiat, apparently a trading station, is situated about 10 miles south-westward of Ras Awath, it consists of a large flat-topped white house with flagstaff, and several huts around, in lat. $5^{\circ} 20\frac{1}{2}'$ N. It lies in a shallow bight, protected from south-west winds by a point

* Nav. Lieut. Nankivell, H.M.S. *Daphne*, 1875.

† Owen.

extending about 2 cables north-eastward of it. Two islets lie in the prolongation of the point, distant about 3 cables, with depths of $2\frac{1}{2}$ fathoms between them and the point, and also around them.*

Dhows find shelter in the bight within these rocks, and there is room for a few close under the point in about 2 fathoms water in south-west monsoon period.

At about 3 cables eastward of the rocks there is anchorage in about 5 fathoms, but there is no shelter. The German vessel of war *Hyane* anchored here in October, 1887, at which time there was a heavy swell, necessitating a large amount of cable being veered. There is good landing under the house at all states of the tide.

RAS AL KHYLE (Moro Cobir or Serpent's head) is in about lat. $7^{\circ} 43\frac{1}{2}'$ N., long. $49^{\circ} 42'$ E. It is the northern of three distinct cliffs jutting out from the coast, about one mile apart, and forms the southern extreme of Negro bay, at the head of which is Wadi Nogal.† Between the point and Wadi Nogal there are depths of 6 to 7 fathoms at one mile off shore.

The village of Al Khyle is situated about one mile westward of the point on a low part of the coast. It consists of from 30 to 40 huts, containing about 200 inhabitants. They form a portion of the Esra M'Hamud tribe, whose northern limit is Ras Mabber. They are a branch apparently of the Mijjertheyn tribe who inhabit the territory lying between Wadi Nogal and the gulf of Aden. The Osman M'Hamud tribe occupy the coast between Ras Mabber and Alula. The Esra M'Hamud tribe consist of several thousand people, whose territory extends about 15 days' journey inland. They possess large herds of cattle, sheep, horses, donkeys, &c., and dried shark forms a considerable article of export. The dhows trading between Zanzibar and Arabia call here at the change of the monsoons, exchanging rice, sugar, tea, and cotton goods for the produce of the country.

Anchorage.—There is anchorage during the south-west monsoon under Ras al Khyle in about 6 fathoms, good holding ground, with the point bearing S. $\frac{3}{4}$ E., village W. by S., and mouth of Kolule river N.W. by N. Between this and the village the water shoals gradually, there being a depth of $2\frac{1}{2}$ fathoms off it. Landing in the south-west monsoon period is not difficult at the village, in native surf boats, which come off on the arrival of a vessel.

* See Admiralty plan of Obiat, scale $n = 1.8$ inches, on sheet of plans, No. 672. The coast between the parallels of $3^{\circ} 40'$ and $5^{\circ} 30'$ N. which includes Obiat, known also as Oppia, is under an Italian Protectorate.

† See Admiralty charts:—Nos. 1012 and 597.

The wind blows with considerable force at this anchorage, and the heavy swell causes a vessel to roll violently, but it is not advisable to go farther in, as the sea appears to be worse there.

During the north-east monsoon period there is probably anchorage under cape Bowen, the north-east extreme of the bay. Close westward of this cape is a ravine, up which at about one mile distance there is supposed to be a spring named Ghobak.

Bank.—H.M.S. *Leven*, in hauling off shore for the night, shoaled the water from 19 to $6\frac{1}{2}$ fathoms when the north point of Ras al Khyle bore S.W. by W. $\frac{1}{2}$ W. about 6 miles; the water then deepened regularly to 26 fathoms on the edge of the bank, when the north point of Ras al Khyle bore W. $\frac{1}{2}$ N. about 8 miles. The German vessel of war *Hyane* (1887) reports a depth of about 6 fathoms, with the point S.S.W. about $1\frac{1}{4}$ miles, but she did not sound; however, the bank does not seem to be dangerous.

Wadi Nogal.—The Kolule river entrance lies about 3 miles westward of Al Khyle village; it is quite dry and its mouth barred by sand in the dry season. There are a few huts near its mouth, with trees, shrubs, and pools of water in the ravine, but the coast itself is desolate.

Wadi Nogal is 10 miles or more from Al Khyle village; it forms a deep hollow in the coast hills in an east and west direction. Its entrance may be recognised by a red cliff, under which are two yellow points, with a dark round-topped hill at the back. There is a basin just within the entrance containing brackish water, but the water, where it enters the basin from above, is quite fresh; in October there was but a slight overflow to the sea.

From Ras al Khyle to Berbereh, the Wadi Nogal, or the happy valley, extends in almost a straight line between two ranges of mountains. It is spoken of in the most glowing terms by the natives, and apparently forms their great road for trade; the people of Ogáhden, Murreyhan, &c., bring all their gums, ivory, and ghí along this valley, as being the safest and least fatiguing route, and the people are described as a peaceful race, who subsist chiefly by the chace, and by their sale of ostrich feathers, myrrh, and ghí or clarified butter. Berbereh, in the gulf of Aden, is the principal port from which these products are exported.

COAST.—From Ras al Khyle the coast trends north-eastward for 120 miles to Ras Mabber: this part of the coast is rocky, varying from 200 to 400 feet in height, and is known to the Arabs as Hazine,

or "rough ground." There is a point in about lat. $8^{\circ} 25'$ N. covered with drifted sand, but the coast is everywhere equally sterile.

There are no known dangers off this coast, and there are apparently depths of about 20 fathoms at no great distance off the southern portion of it.

Winds.—The south-west monsoon ends at Ras al Khyle about mid-October, and after a few days variable winds and calms, and an easterly swell, the north-east monsoon usually sets in ; but sometimes it is as late as the middle of November ; it continues until mid-April when the south-west monsoon sets in. See page 17.

Ras Mabber, also called cape Stand-off, in about lat. $9^{\circ} 24'$ N., is fronted by a reef upon which the sea breaks, and the land in its vicinity is generally low. During the south-west monsoon period there is good anchorage in 6 fathoms on the north side of the cape, where dhows at times put in for water. Both north and southward of the point, the coast is steep, with deep water close to ; in places there are depths of about 16 fathoms at 2 cables off.

The name of the cape indicates the customary practice of the Arab coasters bound northward during the south-west monsoon, who always stand well off from this point in order to round Ras Hafún, and so prevent being embayed in the intervening deep bight.

The Coast from Ras Mabber trends nearly north, to the bight south-westward of Ras Hafún, for a distance of about 60 miles. Depths of from 20 to 30 fathoms are charted from 5 to 10 miles off this coast.

RAS HAFÚN, or "The Surrounded," is a peninsula or prominent headland, 8 miles broad north and south, and 12 miles long east and west, and from 400 to 600 feet in height, rising in steep cliffs from the sea, and formed of sandstone and limestone. The extreme of the peninsula is perfectly flat, and the interior consists of undulating hills, deeply intersected by ravines and watercourses. The south-west point of the promontory of Hafún is high and flat, like a barn, whence it is called Barn hill ; at a distance it appears separated from the rest of the peninsula, the land between being low.*

Ras Hafún is connected with the mainland by a long narrow neck of white sand, shells, and mud, with a few stunted bushes thinly scattered along it, and from its being almost an island, probably takes

* See Admiralty charts :—gulf of Aden, No. 6a ; north-east coast of Africa, No. 100a, scale $m = 0.25$ an inch ; Nos. 1,012 and 597. From Ras Hafún to the end of the chapter is identical with the gulf of Aden pilot, 1887.

its name of Hafún. On either side of the narrow neck of sand is formed a deep bay, with good anchorage, according to the season. There are only a few miserable huts, and a population probably of 50 persons; they are friendly to strangers, and may be trusted. The water in the wells is bad. Cattle and firewood are procurable.

Hafún South bay is best adapted for vessels during the north-east monsoon, but a change of two or three points in the direction of the wind causes a swell to roll in, and a surf to break on the beach. The bay is much frequented by the shark fishers from the Arabian coast, many of whom reside here throughout the year, merely moving their fishing boats to the other side of the isthmus as the monsoon changes.

The depths in the southern bay are regular, decreasing gradually towards the shore, being deeper to the westward than towards the peninsula, where the best anchorage is in 6 or 7 fathoms, sand, at one to $1\frac{1}{2}$ miles from the shore, with the south west point of the peninsula bearing about S.E. On the south-east and east sides of the peninsula there are depths of 15 to 20 fathoms water close in to the cliffs, increasing to 100 fathoms at a distance of 13 miles from the cape. The nature of the bottom is sand and rock.

Hafún North bay is clear of danger, and affords anchorage during the southerly monsoon in 7 to 10 fathoms, hard sand, but the holding ground is not very good. Near the north-west extreme of the peninsula the shore must not be approached by large vessels within three miles, as depths of 3 to 4 fathoms extend nearly that distance from it.

The soundings elsewhere in the bay are regular, and increase gradually from 4 to 6 fathoms close-in, to 38 and 40 fathoms 11 miles distant. The bottom is hard white sand. There is shelter in this bay from southerly winds, but it is doubtful whether a vessel could ride in safety in the full strength of the south-west monsoon, owing to the heavy swell that must roll round the point, and the violent gusts of wind blowing across the headland. These gusts of wind render it necessary to be ready to shorten sail when standing close along the cape or coming to anchor under it.* Large quantities of fish may be caught by hook and line in this bay.

Khor Hurdia, on the north side of the isthmus of Hafún, is

* H.M.S. *Forte*, in May, during a moderate gale from the southward, was anchored in $7\frac{1}{2}$ fathoms, with north-west cape bearing West, and dragged with 70 fathoms of cable out. H.M.S. *Nimble*, at anchor three cables S.S.E. from the *Forte*, also drifted, with 60 fathoms of cable out.

an extensive harbour, $2\frac{1}{2}$ miles wide at its entrance, and 12 miles in depth. As an anchorage it is only available for boats, the depth of water inside being only from one to $1\frac{1}{2}$ fathoms. This is probably the most unhealthy spot on the Somáli coast ; its shores and the bottom of the bay are covered with decomposed vegetable matter, which, on being disturbed, gives forth a noxious gas that is perfectly sickening ; yet there are many fishermen living on the sea-shore who, from long habit, have become accustomed to the exhalations. There is no fresh water in the bay, but it is said by the natives that at Khor Hashera, at the bottom of the bay, there is a stream of fresh water running into the sea. It is possible that the river mentioned in old writers as existing in the neighbourhood of Hafún may be this stream, and Khor Hashera the ancient Opone.

Trade.—During the south-west monsoon, a kind of fair similar to that at Berbereh, though smaller, is annually observed at Khor Hurdia. The merchants from Makalleh, Shuhair (Shehr), and from the Mijjertheyn harbours to the northward and westward, attend this meeting at the end of May, when their dhows are hauled up on the beach ; and a brisk trade is carried on throughout the south-west monsoon in gums, ostrich feathers, hides, ivory, and ghí ; large quantities of ambergris are also brought for sale. Elephant hunting is followed by those who have guns.

Tides.—It is high water, full and change, at Hafún, at 6h. 15m. ; springs rise 4 feet.

CAUTION.—Several vessels have been embayed southward of Ras Hafún in the night and in thick weather ; caution is therefore necessary when approaching it. (*See pages 32 and 33 for precautions when rounding Ras Asír in south-west monsoon period.*)

The COAST from Ras Hafún to Ras Asír, a distance of 80 miles, trends nearly north, forming two large bays, which are separated by the bluff cape, Ras Ali Bash Kil ; between the latter point and Hafún the shore of the bay is low and sandy, and thickly covered with bushes, bounded in the interior, at a distance of 3 or 4 miles, by a range of flat table hills, elevated about 700 feet above the sea, which gradually approach the sea at Ras Ali Bash Kil.

The soundings in the bay are regular, and shoal gradually towards the shore ; the 10-fathoms line is 4 miles from the shore in Hafún bay, decreasing to a quarter of a mile at the northern extremity ; the edge of the bank, or line of 100 fathoms, is about 12 miles distant from the coast. The general nature of the bottom is grey sand and shells.

Water.—There appears to be a plentiful supply of water in this bay. At 5 miles to the northward of the entrance to Khor Hurdia is Handeh, a salt lagoon, except at the head, where it is barely drinkable. There is, however, a well of good water a few yards higher up. At Dehgúbo, 8 miles north of Handeh, there is a well of good water; and 10 miles south of Ras Ali Bash Kil, in a valley formed in the table-land, there is plenty of fresh water, and the inhabitants are numerous.

RAS ALI BASH KIL, is a prominent bluff headland, rising in a steep cliff 400 feet above the level of the sea, with depth of 20 fathoms water at one mile distant.

Ghubbet Binna (Banneh).—Between Ras Ali Bash Kil and Ras Jard Hafún the coast forms a deep bay called Ghubbet Binna; for the first 12 miles the shore is low, sandy, and thinly covered with bushes, with a range of tabular limestone mountains in the rear, elevated 2,700 feet above the sea, descending to the plain in steep precipices, and intersected by fertile valleys. North-westward of this range is Jebel Guraleh, a still higher range of mountains, elevated 5,000 feet above the sea, and terminating at Ras Jard Hafún. On this range of mountains, 11 miles from Ras Jard Hafún, and $3\frac{1}{2}$ miles from the beach, is a quoin-shaped peak, 3,000 feet high, the bluff being to the north-eastward; this bluff is very conspicuous, and may be seen at a great distance in clear weather.

Immediately to the westward of Ras Ali Bash Kil, is Khor Banneh, an extensive lagoon of salt water. At 12 miles to the southward of Ras Jard Hafún, and close to the beach is Khor Abdihán, another lagoon of salt water, with fresh water in the upper part, where it is fed by a stream running from the valley.

There are no dangers in Ghubbet Binna, and the depths increase gradually from the shore, to 20 fathoms, which depth will be found at from 2 to 5 miles distance; the general nature of the bottom is sand and shells off-shore, and rock close-in.

Anchorage.—There is good anchorage, in not less than 7 fathoms, and shelter from southerly winds, off the small village in the south part of the bay, being free from the heavy squalls off the high land.

RAS JARD HAFÚN, or Shenarif, is formed by the bluff termination of lofty table land, 2,900 feet in height.* This table land on its seaward face falls precipitously for about 400 feet, and immediately over the cape the ground from the foot of the precipice

* See sketches on chart, No. 100a.

is much broken in its slope to the sea, with deeply-scored sides, and some remarkably formed rocks. The cape itself is rounded, rocky, and bold to approach, there being from 10 to 16 fathoms water close-to. It is in appearance a remarkably bold and rugged headland, especially when seen from the south-eastward. The land about it and to the southward is dark, and in great contrast with the whitish-brown colour of that between it and Ras Asír. Quoin hill, about 10 miles southward of Jard Hafún, is a conspicuous mark from the southward ; and a rounded sandhill near the coast, at 17 miles southward of Jard Hafún, with a considerable tract of sand extending northward of it and well up the hills at the back, is also a good mark, being the only white sand in this neighbourhood. From Jard Hafún, northward, the high table land of which it is the extreme, takes a north-west direction for about 5 miles, at which distance there is a deep ravine, with a sharp-peaked hill, 2,760 feet in height, northward of it. Between this peak and Ras Asír the hills recede still farther from the coast, the space between being occupied by an undulating light coloured ground resembling hard sand, and rising in a gradual slope from the sea. It is this receding of the high land, combined with the light colour of the slope intervening between it and Ras Asír, that causes the difficulty of making out any land to the northward of Jard Hafún at night, and which has led to so many disasters.

Wadi Tohum is a fertile valley $4\frac{1}{2}$ miles north of Ras Jard Hafún, full of large mimosa trees, with a stream of water running through it. Near its entrance, which is apparently blocked up in the dry season, are numerous habitations, and a cliff about 160 feet in height extends nearly one mile southward from it, beyond which the shore is sandy to Jard Hafún. Northward of Wadi Tohum, to near Ras Asír, the shore is sandy, with the exception of a small cliff about midway.

RAS ASÍR (CAPE GUARDAFUI), the north-eastern point of Africa, 10 miles northward of Ras Jard Hafún, is a precipitous rocky cape 780 feet in height, of a whitish brown colour, and when seen from the south-eastward appears with a moderate slope towards the sea ; the land westward of Ras Asír is a level ridge, the sand hill at 3 miles distant being apparently the end of it. This sand hill is in no way remarkable from the south-eastward, being but little above the ridge. About 3 miles further westward is a steep bluff, forming the eastern extreme of a range of hills facing the north coast, and not far back from it. The cape is frequently enveloped in thick haze, rendering it deceptive in estimating its distance. Approaching

from the north-eastward Ras Asír may be known by the light coloured sand on the top, and the sandy bay to the westward. The cape is steep-to, with 12 fathoms water close in-shore, and soundings extending 18 miles eastward, there being about 100 fathoms at that distance ; to the northward the bank of soundings extends only $2\frac{1}{2}$ miles from the cape.*

Current.—Care is necessary in making the cape from the southward during the south-west monsoon, the current setting up the coast strong to the northward, and close round the cape to the westward ; but at a short distance it continues its course to the northward and eastward. *See* a full description of the current, pages 25, 26, and directions for approaching the cape, pages 32, 33.

Tides.—It is high water, full and change, at Ras Asír, at about 6h. 15m. ; springs rise 6 feet.

Anchorage.—In the bay immediately to the westward of Ras Asír is good anchorage in 9 to 10 fathoms, and protection from southerly winds, with Ras Asír bearing about E. $\frac{1}{2}$ N. and a high bluff S. $\frac{1}{2}$ W. ; more to the westward the ground is rocky. The sand hill in line with the west extreme of a range of hills bearing about S.W. by W. leads to anchorage in $4\frac{1}{2}$ fathoms.

Supplies.—Turtle may be obtained from the natives at this anchorage ; bullocks and small sheep brought from Wadi Tohum may also be purchased ; fish are plentiful and good ; the best place to haul the seine is off the little Somáli village near the beach in a small bay. Water is not to be obtained. For coast westward of Ras Asír, *see* gulf of Aden pilot.

* *See* Admiralty chart No. 100a ; scale, $m = 0.25$ of an inch.

CHAPTER XII.

ISLANDS AND DANGERS IN THE MAIN ROUTE THROUGH
THE MOZAMBIQUE CHANNEL.*

VARIATION IN 1889.

| | |
|-----------------------------------|------------|
| Europa island - - - - - | 18° 10' W. |
| Juan de Nova island - - - - - | 14° 10' W. |
| Johanna, Comoro islands - - - - - | 11° 0' W. |
| Mayotta, " " - - - - - | 10° 40' W. |

EUROPA ISLAND.

EUROPA ISLAND, situated in the fairway of Mozambique channel, is circular, about 4 miles in diameter, from 50 to 80 feet high, and visible from 12 to 15 miles. Its north-east point is in lat. $22^{\circ} 19\frac{1}{4}'$ S., long. $40^{\circ} 27\frac{1}{3}'$ E.

The island is sandy, with low hummocks in places, and for the most part covered with dwarf trees, bushes, rushy grass, and a few small casuarina trees.

The east side presents low perpendicular cliffs, and is apparently steep-to; off the north-east point, however, a reef extends half a cable, with depths of 12 to 18 fathoms, at one cable distant from it.

On the north side is a coral flat, which dries at low water springs, and extends from a quarter to half a mile from the island, except towards the north-west point, where it terminates. The flat is steep-to, with no bottom at 30 fathoms at the distance of one cable; it shows well towards low water. Inside this flat is a large lagoon, with depths of 4 or 5 feet at low water, and well stocked with fish.

The north-west point is sandy, with low bushes, and a rocky ledge extending from one to 2 cables. The west side is rocky, but apparently steep, with a considerable surf on the beach at times.

* See Admiralty charts:—Delagoa bay to Ras Asir, including Madagascar, No. 597; Bassas da India and Europa island on chart No. 851. The description of Geyser and neighbouring reefs, Glorioso, Astove, Cosmoledo, Assumption and Aldabra islands, are omitted from this edition, and will appear in Sailing Directions for “Islands in Southern Indian ocean,” shortly to be published.

The south side of the island is low, and a reef is said to extend one mile or more off the south-west side, but this appears to be doubtful. There are the remains of a wreck on the south-east side.

Anchorage.—There is no safe anchorage, but vessels may let go their anchor on the edge of the coral reef, on the lee side of the island. There is a small spot with 7 to 10 fathoms, close southward of the north-west point, but it is very close to a depth of $2\frac{1}{2}$ fathoms ; also at a cable distant from the reef extending from the north point there are depths of 12 to 18 fathoms.

Landing.—At the north-west point there is a small extent of steep beach, with good landing in moderate weather ; landing at times may also be effected between the rocks on the west beach.

Supplies.—There are some goats on the island and plenty of turtle, in the season ; water may probably be dug from under the casuarina trees. There are no permanent inhabitants, but the island is occasionally visited by traders for its orchilla weed ; there is a hut on the beach at the north-west point used by them.

Current.—H.M.S. *Flying Fish*, in visiting this island in the middle of November, 1875, was drifted to the northward by the current ; when near the island, its direction was to the north-west with a velocity of from 2 to $2\frac{1}{2}$ miles an hour, causing strong tide rips, whirls, and in places almost a race. The current in this neighbourhood is exceedingly variable, both in direction and force, rendering constant observations necessary, to ensure the correct position of a vessel.

Bassas da India, sometimes named Europa rocks, was discovered by the ship *Europa* in 1774.

It was examined in 1878 by Commander Wharton, H.M. Surveying ship *Fawn*, whose observations place the east point of the reef in lat. $21^{\circ} 27\frac{1}{4}'$ S., long. $39^{\circ} 45\frac{1}{2}'$ E.

Bassas da India is a circular reef about 9 miles in diameter and steep-to, enclosing a shallow lagoon ; some rocks from 7 to 10 feet high, are situated on the north and east sides of the reef ; the west and south sides dry 4 feet at low water, and most of the remainder is dry at that time. Several anchors lie on the reef, all that remains of former wrecks. A schooner, bottom-up, was seen in the lagoon by H.M.S. *Osprey*, 1883. Soundings of 720 fathoms, sand, were obtained at one mile from the west side of the reef ; 470 fathoms, sand, one mile from the north side, and 200 fathoms three-quarters of a mile from the south side.

The sea breaks on the reef.

Pilot shoal was reported in 1850 by Captain White, of the American whaling barque *Pilot*, in lat. $21^{\circ} 10' S.$, long. $38^{\circ} 57\frac{1}{2}' E$. The vessel at 7.30 a.m. on January 5th passed over the end of a shoal with, it was assumed, not more than 3 fathoms on it, as the bottom was distinctly seen ; at the same time several patches to windward were observed, which looked shoaler ; the whole extent of the shoal was estimated to be $1\frac{1}{2}$ to 2 miles. This shoal ground was said to lie N.W. by W. $\frac{1}{4}$ W. by compass, distant 35 miles from Bassas da India, but this position does not agree with the lat. and long. given by Captain White ; assuming that the lat. and distance from Bassas da India are correct, then the bearing is probably a true one.

In this locality, namely N.W. by W. $\frac{1}{4}$ W. (true) 35 miles from Bassas da India, an unsuccessful search, extending over a period of four days, was made by Commander Wharton in February 1878. The weather was favourable and the water clear, but no soundings could be obtained within distances of 5 to 15 miles on all sides of the reported position of the shoal, nor could any sign of shoal water be seen from the masthead. A depth of 1,620 fathoms, gray ooze, was obtained 3 miles south-eastward of the alleged position of the shoal.

JUAN DE NOVA ISLAND.

JUAN de NOVA ISLAND,* the centre of which is in lat. $17^{\circ} 31\frac{1}{2}' S.$, long. $42^{\circ} 46' E.$, is low, flat, sandy, and covered with shrubs, some of which are cotton bushes. It is about $2\frac{1}{2}$ miles in length, and the rendezvous for great numbers of aquatic birds in the breeding season, the south-west monsoon period. The island should be carefully avoided at night. A few stunted trees fringe the cliffs, which are about 30 feet in height, and higher than the centre of the island, and visible from a distance of 10 miles. A solitary cocoa-nut tree marked its north extreme in 1878.

Reef.—The reef fronting the north shore dries off nearly half a mile at low water springs ; at half a mile or more beyond it are several rocky patches of 5 fathoms and less, some of which break at low water, with deep water a short distance beyond them. Breakers extend $1\frac{1}{2}$ miles or more off the east and west extremes of the island, and should be given a wide berth. H.M.S. *Penguin*, 1888, found no bottom at 90 fathoms about a quarter of a mile off its south shore.

* See Admiralty chart :—Madagascar, west coast, cape St. Andrew to cape St. Vincent, No. 759 ; scale, $m = 0.09$ inch. For islands and dangers eastward of Juan de Nova, see sailing directions for Islands in the Indian Ocean (about to be published).

Anchorage.—A bank, with from about 8 to 12 fathoms water, extends about 4 miles northward of Juan de Nova, and affords good anchorage during the south-west monsoon period, under the lee of the eastern end in 8 to 10 fathoms, sand, at 1½ to 2 miles from the island.

From the edge of the bank the bottom is plainly visible and continues tolerably level, till about one mile of the shore, where patches of rocks may be met with, as before mentioned. Between the south side of the island and the encircling reef, there is a sheltered anchorage for boats, with 4 feet water.

Landing in moderate weather is easy at high water, on the sandy beach on the north shore, as the swell gradually lessens as the island is approached ; at low water the reef dries off a considerable distance, with breaking patches beyond.

Supplies.—There is apparently some water on the island, as, H.M.S. *Penguin*, November, 1888, found a party of 50 Sakalavas (Madagascar) on the island, who had been there four months catching turtle, and who stated there was fresh water to be had in the centre of the island. Fish is fairly plentiful on the bank, and eels may be caught in the pools in the reefs at low water.

ST. LAZARUS BANK.

General remarks.—St. Lazarus bank was formerly much misplaced on the charts owing to the erroneous positions of the few vessels which had struck soundings on it in passing. Some doubted its existence altogether, in consequence of finding no bottom over almost the entire space assigned to it on the charts, but any doubt on this subject was set at rest by the fact of H.M. ships *Frolic* in 1855, and *Cyclops* in 1861, having anchored on the bank. H.M.S. *Penguin* in 1851, and the barque *Empress* in 1859 also obtained soundings on the bank.

Two vessels are said to have grounded on this bank ; the ship *Reliance* in 1833, and the slave barque *Charles et George* in 1857 ; the latter vessel laid out an anchor in 17 feet water to heave off.

The question has now been set at rest by an examination which lasted six days, made by the boats of H.M. Surveying Vessel *Stork*, Commander T. F. Pullen, February 1889. From this it appears that, the area of the bank within the depths of 100 fathoms is of oblong shape, 11 miles long north and south, with an extreme breadth of 6 miles, and is included between the parallels of 12° 7' and 12° 17' S., and long. 41° 20' and 41° 26½' E.*

Beyond the depth of 100 fathoms the soundings increase rapidly ;

* See Admiralty chart :—Comoro islands with the adjacent coasts of Africa and Madagascar, No. 2762 ; scale, m = 0·06 inch.

at 6 miles north-east of the shoalest part 1080 fathoms was found, and at 14 to 25 miles eastward of the shoal part, 1308 and 1131 fathoms were obtained.

Shoal head.—The general depth was found to be under 20 fathoms, the nature of the bottom being sand and coral. The shoalest part within the depth of 10 fathoms, is near the northern end of the bank, and is about 4 miles long in a north-west direction and 2 miles broad ; the least depth found of $3\frac{1}{2}$ fathoms being confined to a small coral patch in lat. $12^{\circ} 8' S.$, long. $41^{\circ} 21\frac{3}{4}' E.$

Fish in abundance were caught on the bank.

Having regard to the nature of this examination it is considered that the several shoal soundings hitherto reported on or near St. Lazarus bank fall within the area now assigned to it.

In bad weather the sea on any shoal spot would probably break. The lead, however, will give warning of an approach to any dangerous part, and with a proper look-out no risk will be run in passing this bank by day ; but at night large vessels will do well to avoid it, and should they strike soundings it will be advisable to anchor without delay until daylight.*

Tides.—Currents.—A regular tide was observed when at anchor on the bank, the flood setting E.S.E. about 4 hours, and the ebb W.N.W. about 7 hours, with about half an hour slack water ; the strength at springs was 2 knots ; the rise and fall approximately 12 feet. It is probable that at a little distance from the bank, and when out of the influence of the tidal streams that exist upon it, the currents vary in direction and velocity at different times of the year.

The Telegraph Construction and Maintenance Co.'s steamer *Seine*, in August 1885, experienced no current when in the vicinity of the bank.

THE COMORO ISLANDS.

GENERAL REMARKS.—The Comoro Islands, four in number, lie nearly midway between the north extreme of Madagascar and the African coast ; Comoro, the largest and highest of the four, giving its name to the group : the others are Johanna, Mohilla, and Mayotta, all of which are high and of volcanic origin. These islands, except Mayotta, are generally safe to approach, with clear passages between them ; but Mayotta is the only one that affords secure anchorage at all times. The inhabitants are a fine race of people.

The islands are under a French Protectorate.

* See Admiralty chart :—Comoro islands with the adjacent coasts of Africa and Madagascar, No. 2762 ; scale, m = 0·06 inch.

Winds.—The prevailing winds at the Comoro islands are the north-east monsoon, and the south-east trade wind. The former, beginning at the end of October or early in November, is the period of greatest heat, and the rainy season. During this period the wind is variable and irregular, with frequent squalls. The south-east trade, on the contrary, is regular, blowing softly from the south-east, but occasionally fresh, especially during the month of July, shifting to south-west at night. There are occasional showers during this season. The change of the monsoons is marked by calms, variable winds and squalls of wind and rain of short duration. It must be borne in mind that occasionally a cyclone from the Indian ocean passes into the Mozambique channel, and it is not impossible that one may reach to the Comoro islands; seamen, therefore, should be on their guard, especially during the months of February to April. *See also winds at Johanna, page 478.*

Current.—The current between Lazarus bank and the Comoro islands averages about $1\frac{1}{2}$ knots in a westerly direction; a little north-westward of the Comoro group, in December, it has been found setting with a velocity of from 2 to 3 miles per hour in a direction nearly west.* In the vicinity of Mayotta island the current is very variable. This island appears to be to the southward of the general westerly stream which flows past Johanna. Between Mayotta and Johanna the current is generally south-westward, but at times sets south-eastward with considerable strength. About the south end of Mayotta an easterly current is common.

Climate.—The Comoro islands, compared with the coast of Africa, may be considered healthy. Johanna is the most so, as it is everywhere free from mangrove swamps. Doány, in Comoro island, is not considered particularly healthy on account of swamps in the neighbourhood. Mayotta is unhealthy. *See remarks with the different islands.*

Rain.—The rainy season is from November to March; but the mountains probably throw down the rain at all seasons on the weather side; at Pomony, south side of Johanna, the rain is incessant in May.

Communication.—The Messageries Maritime line of mail steamers between Réunion and France call at Mayotta monthly; these steamers also call at St. Mary and Nossi-Bé in Madagascar. Many dhows trading between Madagascar, Mozambique, and Zanzibar touch at Mayotta. *See also p. 8.*

* H.M.S. *Cossack*, 1869.

VAILHEU SHOAL, situated on the eastern side of the fairway of the northern approach to Mozambique channel, has a sand head near its eastern extreme which dries 2 feet at low water. This sand head is charted in lat. $11^{\circ} 51' S.$, long. $43^{\circ} 4' E.$, with Mantzeza hill on Comoro island bearing East, distant about 10 miles, but the position is approximate.* The depths on the other portions of the shoal are from 4 to 6 fathoms, but the accounts of its extent vary from 2 to 12 miles. The water over it is of a light green colour, and it may be discerned at some distance from aloft, with the sun in a favourable position.

When near the parallel of the south end of Comoro at night, vessels should keep to the westward of the meridian of $43^{\circ} E.$, in order to avoid Vailheu shoal.

COMORO ISLAND.—General Remarks.—Comoro also called Angazecha, the northernmost as well as the largest and highest island of the group, is about 35 miles in length, north and south, and about 12 miles in breadth. The principal anchorages are Maroni and Itzanda, on the west coast. *See pp. 469, 470.*

Comoro, unlike Johanna and Mohilla, is not under the dominion of a single sovereign, but is divided into several districts, which each acknowledge an independent chief or Sultan. The vicinity of every village is cultivated with cocoa-nut trees, and the valleys are richly covered with trees and vegetation. The island is remarkably healthy, sickness being scarcely known.

Comoro mountain rises at the south part of the island, its highest part being about 8 miles from its southern extreme; several observations give its elevation 8,700 feet. The summit of this mountain is smooth and dome-shaped, rising so evenly from the sea on its south side as to give a deceptive idea of its height when close to: in clear weather it may be seen at over 100 miles distance. This mountain is the more remarkable from the absence of any land of equal height on the eastern coast of Africa, and also on account of its being the highest mountain in the world as compared with the size of the island.

Comoro mountain, and indeed the whole island, is volcanic: an eruption is said to have occurred about the year 1830, and again in 1855; in this latter eruption the lava issued from several old places, and also on the more eastern part of the island; it then had the effect of driving several dhows on shore, and of casting a great quantity of

* W. J. Olive, Master, R.N., 1847.

fish upon the coasts. Another eruption took place in 1858, on which occasion the lava flowed out of the side of the mountain into the sea on the west coast, between the towns of Maroni and Itzander, which being only 3 miles apart, thus narrowly escaped destruction. As late as 1861 the lasting effects of this eruption could be seen ; all trace of vegetation was destroyed where the stream of lava had passed, and a projecting black point of scorious lava which previously had no existence, had been formed about a mile to the northward of Maroni.

At the south-west point of Comoro, ignited sulphurous vapours are said frequently to issue from the crevices in the ground, showing as lights at night to vessels when passing close. H.M.S. *Undine*, 1883, when off the south point of the island, observed an eruption break out on 1st March, which lasted three days ; lava was noticed running down the mountains in red hot streams, and immense clouds of scoriae were flying about. The popular belief among the natives is that this part of the island is inhabited by devils.

NORTH COAST.—**Ras Baku**, the north point of Comoro island, is in lat. $11^{\circ} 21\frac{1}{2}'$ S., long. $43^{\circ} 19'$ E. All the north shore is low, but rises suddenly within towards the mountains, which are topped by numerous peaks and craters. The summit of this end of the island is 4,500 feet high. A reef, partly dry at low water, extends off the north-west point for the distance of three-quarters of a mile,* and continues along the coast at the same distance as far as the north point of the island.

The town of Mtamuhuli lies close to the north-west point, and is next in size to Maroni and Itzanda. There is an anchorage opposite a small sandy beach about $1\frac{1}{2}$ miles westward of the town in 30 to 35 fathoms water, at 2 cables from the breakers, but it is not a desirable one, on account of the great depth of water and numerous tide rips. A plentiful supply of good water is obtainable, and landing is easily effected at three-quarters flood, on the sandy beach abreast the village.

THE EAST COAST of Comoro island is straight, and the water apparently everywhere deep. The mountain ridge slopes to the water's edge with but little level land, and there are several recent lava streams.

Bwanku.—The north-east point of the island is a rocky promontory, 250 feet high, joined to the shore by a low neck ; the town of Bwanku is situated about 2 miles southward of it. Close to Bwanku there is said to be a small dhow harbour, in which dhows lie in perfect safety even in the north-east monsoon period.

* The information relative to Comoro island, from the north-west point round by north and east to the south-west point, is by Com. Wharton, H.M. Ship *Fawn*, 1878.

Mbagini is a walled town about two miles northward of the south-east point, and is said to be one of the largest in the island.

The south-east point is low, with a cone-shaped crater near its extremity. The coast is here bordered by a narrow reef, with depths of 30 fathoms at 1½ miles from the beach. Inland are sharp cone-shaped peaks rising from the southern spur of Comoro mountain.

Shindini.—Close southward of the south-east point is the village of Shindini; dhows find an anchorage here inside the reef fronting it; the passage through the reef is narrow, and situated a little southward of the village.

THE SOUTH COAST of Comoro island is also low, with flat land within, the hills beginning to rise at 1½ miles from the coast.

At the south-west point the land rises rapidly from the water's edge, without a break to the summit of Comoro mountain, 8,700 feet above the sea. There is a village close to the sea a little eastward of the south-west point.

The south coast is rocky and steep, and the country vessels frequently sail along within speaking distance of the shore.

THE WEST COAST is said to be bold of approach, and to have no anchorages, except Maroni and Itzanda; there are several villages along it. Mantzeza hill, better known as Round hill, situated about 3 miles northward of south-west point, is remarkable; it is about 700 feet high, juts out into the sea, and presents a bluff face to seaward, but a reef extends about a mile from it. The town of Mantzeza is situated on the south-east side of the hill. When seen from the westward this hill alters its aspect; it then appears to be an oblong hill with small ravines from top to base, as if it had been ploughed.

Iconi hill, also jutting out into the sea, is about 3 miles northward of Mantzeza; when seen from the southward it appears like a saddle, and presents a steep face to seaward, but on nearing it a low point of small extent will be observed stretching out from its base, and just to the southward of and under the hill will be seen the town of Iconi which is of considerable magnitude. This hill, when seen from the westward, presents two peaks with a deep hollow between them; there are the ruins of a white stone building on the apex of the northern peak.

About one mile northward of Iconi hill a low point projects; above this point, some way up the side of the mountain, there is a large walled town. About 2 miles northward of Iconi hill, another low

point will be observed with two or three large trees on it ; round this point is the bay of Maroni. Between Maroni and Itzanda, a distance of about 3 miles, the coast is rocky and steep-to, and about a mile to the northward of Maroni a low black point projects, now forming the northern extreme of Maroni bay ; this point was produced by an eruption of lava in 1858. At about one mile northward of Itzanda a walled town will be seen some way up the side of the mountain. From Itzanda northward we have no written description of the coast.

MARONI BAY, on the west coast of Comoro island, is half a mile wide and about a quarter of a mile deep ; nearly the whole of this bay is occupied by a shoal composed of coral and sand, the outer edge of which has 9 to 15 feet water on it, and extends from the south extreme of the bay to within a few yards of the north point ; abreast the north end of Maroni town lies a dark rocky islet named Suadzu, which at low water is connected with the shore.*

Anchorage.—Abreast Suadzu, with Iconi hill bluff seen just open west of the trees of the south point of Maroni bay, there is a depth of 12 fathoms at about 120 yards from the edge of the shoal. A white house in the centre of Maroni town, bearing S.E. by E. $\frac{1}{4}$ E., leads into the best anchorage ; on this bearing a depth of 30 fathoms will be obtained at about $1\frac{1}{2}$ cables from the edge of the shoal, decreasing gradually to 4 fathoms at one cable distant from Suadzu islet.

Dhows pass to the head of the bay at high water and lie aground ; there is good landing here.

H.M.S. *Brisk* anchored in 25 fathoms, with Suadzu islet bearing S.E. by E. $\frac{1}{4}$ E., and the extreme point to the southward S.W. $\frac{1}{2}$ S. In this position with 60 fathoms of cable the vessel had only good room to swing clear of the rocky flat.

As the bank of soundings is so limited in Maroni bay, strangers will do well to send a boat in previously to find a berth, and anchor as a guide.

This anchorage is protected from the violence of the southerly wind and swell by Iconi hill, but it is too close to the rocks for a sailing vessel to get out, if the wind comes in from the westward ; and in the northerly monsoon it is worse.

The town of Maroni stands at the head of the cove, and is surrounded by a wall ; it is chiefly composed of detached huts, and the streets are narrow and dirty ; besides the huts there are several substantial stone buildings. The Sultan of Maroni is the chief

* See plan of Maroni bay, on Admiralty chart, No. 2762.

with most influence in Comoro, although the district subject to his authority is not large.

Supplies are cheap and plentiful, particularly cattle, which are exported to the other Comoro islands. Water, however, is scarce, and said to be so all over Comoro.

Tides.—It is high water at Maroni, full and change, at 4h. 53m. ; springs rise 10 feet.

ITZANDA BAY and town are situated about 3 miles northward of Maroni, the two bays being somewhat similar. The anchorage, like that of Maroni, is very indifferent, being deep and close to shoal water, although the soundings at Itzanda may extend a little farther ; vessels should not anchor in less than 20 or 25 fathoms, which depth will be found about midway between the extreme points of the bay. There is a good landing at the head of Itzanda cove, near a tree of large girth.

Itzanda is governed by an independent chief, who does not, however, possess any importance. The town is walled in, like Maroni, and is about the same size. There is a village northward of the town, and at the north extreme of the bay, at the head of a small inlet, there is a well.

MOHILLA ISLAND.—**General Remarks.**—Mohilla is the smallest and least elevated of the Comoro islands, being about 13 miles in length east and west, by 10 miles in breadth north and south, not including some small islands which lie about 3 miles from its south shore. Mohilla is about 1,900 feet high ; on the east side the land is low near the sea, rising gently to the mountainous ridge extending through the middle of the island, which has no peaks, and appears capable of cultivation to its summit. The island is well wooded, being covered with trees to the summit. Doány is the principal town in the island.

Mohilla in 1865 was governed by an independent queen, a niece of Radama I. of Madagascar, and was educated by the French ; as before stated all this group are under a French Protectorate.

White rock is a remarkable islet off the south-east end of Mohilla, from which it bears N. 76° E., nearly 4 miles : it is about 100 feet high, flat-topped with steep sides, but has a low, flat

* See Admiralty Chart :—Madagascar, cape St. Andrew to Antongil bay, with the Comoro islands, No. 758 ; scale, $m=0\cdot85$ inches ; also No. 2,762, with plans.

projection on its west side. From a distance it has the appearance of being bold-to, and there is a good channel between it and the island Nyanze and several other islets off the south-east end of Mohilla, the outermost of which is distant about $1\frac{1}{4}$ miles, but these are not so high or remarkable as White rock.

H.M.S. *Seagull*, in 1881, passed over a bank with depths of 10 fathoms, at about 2 miles southward of a line joining White rock and Nyanze islet.

The East coast of Mohilla is nearly straight, with depths of 8 to 14 fathoms at one to $1\frac{1}{2}$ miles off, and 14 to 17 fathoms from $1\frac{1}{2}$ to 2 miles; it appears to have anchorage everywhere at these distances, but it should not be approached within one mile.

Table bluff, situated about midway between the south-east point and Fumboni, is steep-to, with good anchorage close northward of it.

FUMBONI BAY, in which is situated Doáni, the principal town on the island, lies 3 miles south-eastward of the north point. The shore of the bay abreast the town is fronted by a reef to the distance of half a mile or more, with detached rocks and shallow water for about one cable beyond; two breaks in the reef afford shelter for dhows.

Doáni is a brown, dull-looking, walled town close to the beach, in Fumboni bay, with a dilapidated rampart for a battery of guns along its sea face. Near the north-west corner of the town, facing the beach, is a sugar factory with white chimney; the house of the manager, with a square tower and flagstaff, adjoins it. These are conspicuous from seaward, having the appearance of a casemated barrack. The natives are a peacefully disposed people, very similar to those of Johanna, but the population is not large. The island is very fertile; coffee and spice trees grow luxuriantly in a plantation belonging to the Queen, and cocoa-nuts abound. Cattle are good and cheap. Doáni is not particularly healthy.

Position.—The tower and flagstaff are in lat. $12^{\circ} 17\frac{1}{4}'$ S., long. $43^{\circ} 43'$ E. (approximate).

The Anchorage off Doáni is good during the southerly monsoon, although at times there is more swell than would be expected under the lee of the island; during the north-east monsoon there is a considerable swell, and being a lee shore it is not safe.

A patch of $4\frac{3}{4}$ fathoms is charted with the square tower (Langle house) bearing S.W. by W. $\frac{1}{2}$ W. distant $1\frac{2}{5}$ miles, and there is said to be some rocky heads with 5 fathoms water, and 8 fathoms around,

with the flagstaff bearing S.W.; distance from the shore is not known.

The best anchorage is said to be in 10 to 12 fathoms, sand and shells, about three-quarters of a mile off shore, with the square tower in line with the southern of the two clumps of trees, bearing S.W. $\frac{1}{2}$ W., and the south-east bluff about S.E. $\frac{1}{2}$ S.

Inside this berth the soundings shoal quickly to 7 and 6 fathoms; the anchorage is considered good in these lesser depths, but large vessels are recommended not to go within the depth of 9 fathoms. The anchorage should be approached with caution.

Doáni cove is a small dhow harbour formed by the coral reefs. The entrance between the reefs is narrow and obstructed by a central coral shoal, but there is a depth of 5 or 6 fathoms on each side of it. Inside the harbour there is not room for anything larger than dhows to swing.

The landing place is in this cove; it is inconvenient at low water, owing to the sandy beach stretching out very flat, when boats cannot approach within 250 yards of the dry beach. When there is much surf on the reef the entrance to the cove shows plainly, but if only breaking occasionally some care is necessary not to miss the entrance. A drop in the high land forms a good leading mark, but it cannot well be described.

The watering place is about one mile south-eastward of the anchorage, and is not convenient; the island, however, is well supplied with water.

Tides.—It is high water at Doáni, full and change, at about 4h.; springs rise 11 or 12 feet.

NORTH COAST.—Between Fumboni bay and the north point of Mohilla the coast is said to be skirted by a reef, at about one mile distant, with a boat passage inside it. There is a black rock always above water about 2 miles south-west of the north-west point, with no bottom at 40 fathoms at 2 miles westward of it. A ledge of rocks projects a quarter of a mile from the north-west point, with no bottom at 30 fathoms at 1 $\frac{1}{2}$ miles distance.

Anchorages.—There is anchorage on the bank fronting the shore between Fumboni bay and the north point of the island, abreast Putsi village, and also westward of the north extreme, abreast Domoni village. The soundings at these anchorages are tolerably regular, with depths of 8 to 14 fathoms at 1 $\frac{1}{2}$ miles from the shore. There appears to be a good watering place at or near

Domoni, available for boats; the stream is situated in a ravine about 200 feet above the beach, by an easy ascent. Boats can land near it between half flood and half ebb.

Tides.—On the north shore of Mohilla the flood sets to the westward, but changes before the water has done rising, as does the stream to the eastward before low water.

THE SOUTH COAST of Mohilla has a chain of volcanic islands near its south-western part, at about 3 miles off, with depths inside them of from 26 to 35 fathoms, sand and shells; these islands are for the most part surrounded with reefs, but may be approached on their northern sides within one or 2 cables. The three principal are Choa Canzuni, Choa Jumajini, and Choa Sanzi.

Choa Sanzi has an islet at its southern extreme perforated with round holes, which at a distance appears like the Needles rock, and may be closely rounded. A small but rather high island named Choa-Mbubu, lies north-eastward of it, with a rock which covers at high water at its south point, to which give a berth of 2 cables.

NUMA-CHOA HARBOUR, on the south side of Mohilla, lies between sand and coral reefs, for the most part dry at low water. It is sheltered from southerly winds by the islets before mentioned, and by Choa-Moa (Maya) islet lying half a mile to the south-eastward; a swell sets in with south-easterly winds, to which it is exposed, but there is little danger of dragging. In the northerly monsoon period it affords complete shelter. At this latter period it is frequently crowded by dhows trading between Zanzibar and Madagascar, but in the south-west monsoon period some make Fumboni their port of call. A good position for anchoring is in about 10 fathoms, sand and mud, with Numa-Choa point N.W. by W. $\frac{1}{2}$ W., and the extremes of Choa-Moa between South and S.S.E.

Directions.—Approaching from the westward, steer for the south extreme of Foro islet in line with the north extreme of Choa-Moa; this leads between Mohilla and its outlying islands. Foro islet may be known by having a peculiar rent near the south-end, whilst the north point forms a pillar. Choa-Moa should apparently be passed at the distance of 2 cables or less, to avoid the reef extending from Numa-Choa point for a distance not well known. After passing Choa-Moa, the high red cliff at Numa-Choa point will be observed; bring the west end of the cliff, which is a bluff with some large mango trees on a sandy beach below it, to bear N.W. by W. $\frac{1}{4}$ W.; this will lead into the anchorage.*

* Nav. Sub-Lieut. T. C. Pascoe, H.M.S. *Vulture*, 1874.

With the bluff on this bearing, a peaked hill situated about one mile eastward of Miremani bay, will be seen just open of the bluff ; this hill must not be shut in until Choa-Bubu island is well open of Choa Sanzi island, when the course can be altered to the northward, and the vessel anchored in 8 to 10 fathoms. There appears to be no bottom with the hand-lead until near the entrance to the harbour.

The reef around the harbour is steep-to, and can generally be seen from aloft.

Approaching from the eastward, if bound to Numa-Choa, pass the south-east end of Mohilla at 2 or 3 miles distance, and follow the south coast until Sail rocks (off the south-west extreme of Mohilla) are open southward of Choa-Moa island N.W. by W. $\frac{1}{2}$ W. (Choa-Moa is a small but high conical island with a flat top, and is the easternmost of the group, except Foro, a small islet near the shore.) This mark kept on will clear the reefs which front the shore between south-east point to nearly abreast Foro ; when Foro islet bears North, steer midway between it and Choa-Moa ; thence Numa-Choa red cliff bearing N.W. by W. $\frac{1}{2}$ W. will lead to the anchorage, as before.

The Town of Numa-Choa, to the westward of the harbour cliffs, is a walled town of considerable size, and fronted by a sandy beach. The houses are mostly composed of matting. The principal trade is in cocoanuts, which are sent to Madagascar. The natives appear to be good artificers, the Comoro and Johanna dhows being sent here for repairs.

Supplies.—There are several convenient watering places on the south side of Mohilla ; one of them is at the head of Numa-Choa harbour. The beach on Choa-Moa island is very convenient for hauling up or repairing boats, &c., as it never covers ; very fair seining can be had here, and men can bathe with safety as there are no sharks.

Tides.—It is high water at Numa-Choa, full and change, at about 3h. ; springs rise about 14 feet.

Miremani bay lies half a mile eastward of the south-west point of Mohilla, and $3\frac{1}{2}$ miles westward of Numa-Choa. It is said to be a well sheltered anchorage in 10 to 20 fathoms, sand and mud, being protected on each side by coral reefs, which extend from 4 to 6 cables off shore. On the western reef, at rather less than a quarter of a mile from the shore, there are two rocks with perpendicular sides, named from their appearance Sail rocks ; they are visible at 9

or 10 miles distance. About three-quarters of a mile south-eastward of the entrance to Miremani bay there are some rocks above water, named Flat rocks.

Bank.—H.M.S. *Undine* anchored in 18 fathoms upon a bank on south-west side of Mohilla island, from which Luala point bore N.N.E., and the south extreme of Choa Canzuni, S.E. by E.

Upon weighing, the following morning, soundings from 16 to 10 fathoms were obtained and carried to an anchorage off Choa Djumajini.

JOHANNA ISLAND.—General Remarks.—Johanna is next to Comoro in size and in height, but far surpasses it in beauty and fertility : in form it is triangular, each side being 18 miles in length ; the east side trends nearly north and south, and the north-west side forms a deep bay where the principal town is situated. This island as seen from the westward is a succession of peaks one rising behind the other ; all are wooded to the top.*

When first seen from the eastward it makes, in two peaks, the highest to the northward.

Johanna is governed by an independent Sultan, who resides at the town of Johanna on the north-west side. The natives are hospitable and well disposed to Englishmen, whom they have long been accustomed to look up to as their protectors and advisers when in difficulty. They are of Arab origin, but the lower orders are much intermixed with the African race ; the Swaheli language is fairly understood here. The slavery in this island is of a very mild and domestic form, the authority of masters over their slaves being in many cases almost nominal. The population of the island, according to the report of our Consul at Zanzibar, was (1882) from 15,000 to 16,000.

The Climate of Johanna is on the whole healthy, the shores being nearly everywhere free from mangrove swamps. The cruisers on this station generally consider this island a sanitarium as compared with the other parts of East Africa.

Trade.—The export from Johanna is chiefly sugar, though there is not much land suited for its growth ; what has been produced is of excellent quality. Coffee is also cultivated, the climate and soil being well adapted for it.

* See plan of Johanna road, on chart No. 2762.

Johanna peak, situated near the centre of the island, is 5,177 feet above the sea, of conical form, and probably a thousand feet higher than any of the others; except in the early morning it is rarely to be seen, being obscured by clouds. From the peak a spur of mountainous land projects towards each of the three ends of the island. Johanna is, like the other Comoros, volcanic, but not actively so now; the traces of former eruptions are very distinct close outside the town of Johanna, where vast accumulations of cinder may be observed cropping out on the roadside.

There is a lake, probably the crater of an extinct volcano, at a considerable elevation in the mountains at the back of Pomony; it is held in superstitious dread by the natives.

NORTH COAST.—A reef extends about 3 cables W.N.W. of the north-east point of Johanna, outside which the soundings are regular; tide rips extend some distance beyond the reef, so that it is advisable to give the point a good berth in rounding.

The coast between the north-east point, and Saddle island off the west point, a distance of 15 miles, forms a deep bay, in which is the town of Johanna. For about 4 miles eastward of Saddle island the shore is fronted by a reef extending nearly half a mile in places, but farther eastward it decreases; the green line of reef shows at high water, and at about half tide the reef breaks everywhere, except with smooth water.

From the head of the bay the soundings deepen regularly from the shore to 20 fathoms, increasing to 42 fathoms at half a mile, and 350 fathoms, soft black mud, at one mile.

Wháni.—The old town of Wháni is about midway between the north-east point and Johanna town.

Stangini bay is situated between Wháni point and Johanna town. There is good anchorage in 14 fathoms, coral and sand, about a quarter of a mile from the shore reef, with the bottom clearly visible.

Two beacons in line lead to the anchorage; these are white and surmounted by cages; the lower one is just northward of a conspicuous sugar store.

H.M.S. *Undine* was at anchor here in June 1883; during this time the water was smooth, though occasionally a swell set in, but not sufficient to cause any uneasiness. Supplies are obtainable here, and the beach is a good place to haul up boats under shelter of the trees.

JOHANNA TOWN, also known as Mutsamudu, lies near the head of the northern bay, at about $6\frac{1}{2}$ miles from the north-east

point. The town, which is on low ground close to the sea, is substantially built of stone, with narrow winding streets, and is surrounded by a wall ; it is overlooked by a dilapidated fort on a height immediately at the back. Johanna is the residence of the Sultan of the Comoro islands, and contains from 5,000 to 6,000 inhabitants.

The English consulate is a detached building close to the beach about 300 yards westward of the town.*

Position.—Johanna town is situated in about lat. $12^{\circ} 10\frac{1}{2}'$ S., long. $44^{\circ} 22'$ E.

Beacons.—At about three-quarters of a mile south-westward of the town, and about 200 yards westward of a round and conspicuous grassy hill, is a white stone beacon about 14 feet in height, serving as a mark for the anchorage : a similar beacon is situated about 30 yards eastward of it. This second beacon was erected as the western one could not be seen until close in, on account of the foliage ; the second is being hid in the same manner.†

There is a bluff point of rock about 400 yards westward of the beacon.

The Anchorage off Johanna town and also off the watering place is limited in extent, and close to the shore ; vessels should therefore be prepared to anchor immediately on obtaining soundings with the hand-lead.

The best anchorage is abreast of the cocoa-nut plantation, beacon, and watering place, about three-quarters of a mile south-westward of the town. The soundings deepen regularly from abreast the beacon, to 20 fathoms at a quarter of a mile distance, the bottom being dark sand with small pieces of coral and shell.

A good and convenient berth during fine weather will be found in about 10 fathoms, with either of the beacons bearing S.S.E., and Black rock bearing East, about one cable from the 5-fathom line off the coral flat.

There is anchorage abreast the town, but it is not recommended, the bank here being steep ; during the southerly monsoon it is an unsafe position, being too near the coral flat.

Between the two mentioned anchorages a coral flat, dry at low water springs, extends about $1\frac{1}{2}$ cables from the island ; it commences at the beach near the beacons, and terminates near Black rock, just westward of the English consulate. Off the edge of this flat the bottom is rocky and uneven.

* See plan of Johanna road, on Admiralty chart, No. 2762.

† H.M.S. *Kingfisher*, 1885.

Tides.—It is high water at Johanna town, full and change, at about 3h. 40m.; springs rise 11 feet.

Directions.—During the southerly monsoon it is best for sailing ships to approach Johanna town from the westward, where a fresh breeze will often be found, whilst it is calm to the eastward: approaching from this direction, give Saddle island a berth of 2 miles, as at times there is a considerable swell and no wind under its lee: thence a vessel will often fetch the anchorage without a tack. Be prepared for squalls, which occasionally come off the land in furious gusts. During the north-east monsoon, on the contrary, it should be approached from the eastward, on account of light winds and westerly currents, which sometimes sweep a sailing vessel away towards Mohilla.

Winds.—The north-east monsoon reaches Johanna about 14 days later than Zanzibar. Its first decided blow occurred three consecutive years on December 25th at Johanna. January is generally considered the worst month in the year for anchoring on the north side of Johanna, as strong northerly winds sometimes occur, but heavy winds seldom blow home to the island; frequently the only indication of a very strong breeze outside is a surf on the beach, which prevents landing. A European resident states that in 7 years, during which the bay had been visited at all seasons, the only accidents which had happened were two vessels being blown to sea by the wind off the land. Nevertheless this is not a desirable anchorage during the north-east monsoon.

During the south-west monsoon this anchorage is quite smooth and safe. Vessels should lie with a good scope of cable, as violent gusts blow off the land.

Supplies are plentiful at Johanna; the cattle are small, but of excellent quality, at a cost of from 10 to 15 dollars a head. Fowls are small also, and cost 1½ dollars a dozen. Sweet potatoes, yams, cocoa-nuts, fruits, and other supplies are abundant.

The Watering Place is abreast the south-west anchorage, and is a small stream about a 100 yards westward of the western beacon; it flows through the cocoa-nut plantation, and generally discharges itself into the sea in two branches. This water is easily obtained and is excellent, except during the rainy season, when the quantity of vegetable matter brought down from the hills renders it bad after being kept a short time on board. In watering here, a considerable length of hose is required to enable the boat to lie

afloat; the beach, being composed of large round stones, is not suited for rolling casks.

There is a good stream of water near the coast, close westward of the town, but it is not commonly used for shipping, as the natives are constantly bathing and washing in it. Another stream of water, off which there is anchorage, runs into the sea at $1\frac{1}{2}$ or $1\frac{3}{4}$ miles westward of the town.

COAST.—About 6 miles westward of Johanna town there is a small deep bay, close westward of a bold bluff named Assombe; this bight is open to the northward, and has at its mouth a remarkable group of black rocks, with anchorage for small craft inside them.

Saddle island, situated off the north-west point of Johanna, is small, bluff, and saddle-shaped, as its name implies, and is about 400 feet high. The island is apparently bold on its northern sides, but from the west point a reef extends south-westward about one mile, whence it trends south-eastward, and forms the reef which skirts the southern coast of Johanna. There is said to be a good anchoring ground in about 12 fathoms, on the north side of Saddle island. There are two islets on the reef, southward of Saddle island, with a boat channel between them.

Tide rips.—Off Saddle island (as well as off the other extremities of Johanna) tide rips give an appearance of shoal water beyond the reef to an extent of a mile or two. The bottom is probably rocky and uneven, but in passing over these appearances of broken water no bottom has been reached with the hand lead, and it is considered that no dangers exist beyond the reef, which is plainly visible except at high water.

THE SOUTH-WEST COAST of Johanna is about 20 miles in extent, and slightly concave; several spurs of high land extend from the summit towards the coast.

The south-west coast is skirted with a reef, which extends in places nearly one mile, but off the greater portion of the coast it is not more than 3 or 4 cables. Southward of Pomony, in places, the reef terminates. About one mile south-eastward of the factory there is a bay apparently free from reefs, but it has not been examined: at the northern extreme of this bay a stream of good water runs into the sea.

There is a similar bay about one mile north-westward of Pomony harbour, with a stream of good water, and at 5 miles farther north-westward there is a harbour formed by the reefs, somewhat similar

to Pomony, but it is said to be obstructed by shoals, and only fit for dhows.

POMONY HARBOUR is situated on the south-west coast of Johanna, about 12 miles south-eastward of Saddle island. Its position may be known from seaward by being under a saddle in the high land, and by two peaks like dogs' ears, which are immediately over the harbour; also by the sugar factory with its white square chimney, situated about three-quarters of a mile eastward of it.*

The harbour is a circular basin, about $2\frac{1}{2}$ cables in length by nearly 2 cables in breadth, formed between the coral reefs, with depths of from 7 to 15 fathoms, black sand; the south-eastern reef projects half way across the entrance in a long narrow spit, and the whole of it is dry at low water springs. There is a boat channel from the head of the harbour to the factory, practicable only when the sea is smooth.

The north-western reef is partly dry at springs, and there is a boat channel to sea inside this reef which is practicable in all weather, the sea in rough weather being always broken by the outer and shallower part of the reef.

The reefs inside the harbour are steep-to, but abreast the shore the bank is shelving; in case of necessity a vessel can beach for repairs. This harbour will safely contain 5 or 6 small vessels if properly moored, but vessels of over 200 feet long should not enter the harbour, there not being space enough for them to moor with sufficient scope.

During the north-east monsoon the harbour is quite smooth, and at low water it is as smooth as a dock at all times of the year, though strong gusts of wind come down occasionally off the land. During the south-west monsoon the harbour is generally smooth enough for all purposes, but when strong southerly or south-westerly winds occur at spring tides, although all heavy sea is broken by the reefs, sufficient swell rolls in at high water to cause a confused boiling sea, and to make dry landing impracticable: if it were to blow very hard from that quarter at high water springs, the harbour would be unsafe, unless special precautions were taken, such as placing an anchor close over to the weather side of the harbour, so as to lie with a long scope of cable; but the south-west monsoon rarely blows home with force, and there are no reports of its ever having amounted to a gale.

Shoal.—A coral patch, one cable in extent, with a least depth of one fathom on its eastern extreme, lies in the centre of the entrance

* See plan of Pomony harbour, on chart of the Comoro islands, No. 2762.

to the harbour, abreast the south point of the north-west reef, and less than half a cable distant from it; the patch does not generally show well, and is treacherous for boats, a solitary surf sometimes breaking at long intervals. Two of the boats of H.M.S. *Brisk* were capsized here; on one occasion when the water appeared tolerably smooth a surf rose and turned the whale boat end over end.

Beacons.—An iron pole, surmounted by an arrow, is placed 30 feet within the northern extreme of the south-east reef, east point of entrance to the harbour. Two white pillars are erected near the new village, about 200 yards apart, in a N. by E. $\frac{1}{2}$ E. and opposite direction.

Directions.—The best entrance channel to Pomony harbour is that eastward of the centre shoal; it is about 100 yards wide, and the south-east reef, forming the east side of the channel is steep-to and distinctly visible. The two white beacons near the village kept in line bearing N. by E. $\frac{1}{2}$ E. lead in mid-channel. When abreast of the beacon on south-east reef, distant about 50 yards, haul sharp round to the eastward into the harbour.

There is also a deep channel between the centre shoal and north-west reef, but it is very narrow, and should not be used except on emergency. When there is much swell the surf rolling over the reef into the harbour causes a considerable outset in the channel.

The harbour being very small, care is required not to enter with too much way, so as to be able to turn short round the extreme of the south-east reef. Vessels should moor with open hawse.

Winds.—During the north-east monsoon light land and sea breezes generally prevail, and occasionally shift from one to the other several times during the day; at this time there is no difficulty in going out under sail if a proper time is chosen, but it should not be attempted unless the land wind is steady. In 1883, the first-blow of the north-east monsoon came on the 14th January, accompanied by heavy squalls, lightning, rain, and occasional thunder.

During the south-west monsoon sailing vessels will frequently have to wait some days for an opportunity to get out. In May, rollers are heavy at times along this coast, and the rain is incessant.

Tides.—It is high water at Pomony, full and change, at 4h. 0m.; ordinary springs rise 11 feet, and neaps 9 feet. The equinoctial springs rise 13 feet, and the same rise not unfrequently occurs at other times of the year.

Supplies.—Cattle and other supplies are plentiful, the latter being

brought round from Johanna town when required in any quantity. Beef is about 5d. per lb. and fruit is cheap and plentiful.

There is a good watering place at a stream which enters the sea near the factory ; here the water is excellent and may be made to run into the boat by placing a starting hose a little way up the rocks past the bridge. In smooth weather, boats can proceed across the reef from the harbour and enter the stream towards high water, but when there is any swell they have to lie outside the surf with a great length of hose, and must return to the harbour by the ship channel : of course when there is much surf, landing at the stream is impracticable, but this is of rare occurrence.

There is also a stream in the harbour near the new village, with a deep pool inside : this is convenient for washing clothes at, but it comes from marshy ground and is probably not wholesome for drinking.

Small repairs to vessels with no competent artificers, may be done through the kindness of the sugar planters, who possess a forge ; they also have a steam launch.

Communication.—Sugar ships trade between Mauritius and Pomony, at intervals of about 2 months ; except by dhows there is no other communication. A French mail steamer calls at Mayotta. *See page 465.*

Outer Anchorage.—There is good anchorage in 14 fathoms, at about a quarter of a mile off the mouth of the stream situated about one mile southward of Pomony village, with the factory chimney bearing N.E. by E. ; here there is a break in the reef fronting the coast : there is said to be a depth of 30 fathoms, at half a mile from the shore.

Strangers approaching this anchorage should steer for the factory on the above bearing, as on the north-west side of this bearing the reef extends 2 or 3 cables from the shore, and on the south-east side there are some detached rocks, the largest of which only covers at high water.

This anchorage being immediately abreast of the stream is convenient for ships watering during the north-east monsoon ; at the south-west monsoon period vessels will generally find this anchorage practicable, but they should be prepared to leave on the appearance of strong winds or heavy swell.

EAST COAST.—The south point of Johanna is bluff, of considerable height, and surrounded by a reef which extends from three-quarters to one mile : two islets lie close to the shore about one mile eastward of the southernmost part. During the southern monsoon there is occasionally a heavy sea off this point, with overfalls ; at

times it has been found rolling heavily as if the water were shallow, but no bottom has been reached with the hand-lead.

From the south extreme of Johanna the coast trends nearly north for 17 miles to the north-east point ; it is high and rocky, with few indentations, and is apparently steep-to ; coral reefs skirt it in places, with channels between them for boats and small vessels. Between Demony and the north-east point the reefs cease in places, and the coast is then very steep ; the reefs re-commence near the north-east point. As but little is known of the depths along this coast, it should be given a wide berth.

Demony is stated to be a small dhow harbour within the reefs on the east coast, at about 8 miles northward of the south point.

Near, or at Demony, is a sugar estate belonging to the Sultan, with a large factory built of stone, and all the machinery necessary for making sugar. 1,000 slaves are said to be employed here. There is said to be good anchorage off the factory in 8 to 15 fathoms, at 3 or 4 cables distant from the shore, at all times of year except August and September, when strong easterly winds prevail.

MAYOTTA.—General Remarks.—Mayotta lies 40 miles south-eastward of Johanna. It is of irregular form, 21 miles in length, north and south, with an average breadth of 6 or 7 miles, and outlying reefs, varying in distance from 5 to 12 miles. The island is remarkable from all points of view, owing to its uneven surface ; volcanic looking peaks rise in all parts, the highest of which is Mavégani mountain, situated about 4 miles southward of the centre of the island ; Mavégane has two peaks close together, of which the westernmost is the higher, being 2,164 feet above the sea.

The most remarkable mountain is Uchongui, a sugar-loaf peak, 2,105 feet high, which rises from land of inconsiderable elevation, at less than 3 miles from the southern extreme of the island. From the southward, Uchongui mountain will be seen before any other part.

Mayotta is a French colony, with a small military and naval dépôt at Zaudzi, on Pamanzi island, established in 1844.

Off Zaudzi is the principal anchorage, which is a secure one at all times (page 490) ; from the westward it is approached by the Zamburu

* See Admiralty chart of Mayotta island, with views, No. 2741 ; scale, m = 0·7 inch.

or Duamuni passages (pp. 485-487), and from the eastward by the Bandéli (page 488). There are many other good anchorages.

There are many villages in the island ; among them may be mentioned the ancient capital of the first sultans, Chingoni, on the west side of the island ; also M'Sapéré, the most important of the colony, at which most of the trade is transacted between the Banians and the native population.

Products.—The island is productive in most parts ; large trees suitable for shipbuilding exist, principally near Boeni and Debeny bays. The southern part of the island is covered with cocoa nut, banana, orange, citron, tamarind and other fruit trees, in a wild state ; sugar cane, cotton, tobacco, rice, sweet potato, maize, and other articles of food are grown in abundance : the western portion of the island, also Pamanzi island afford excellent pasturage.

Population.—In 1882 the total population amounted to about 10,000, composed chiefly of Antalotes, Arabs, natives from the coast of Africa and Madagascar, and Hindis. The white population amounted to 216.

The Climate of Mayotta has the reputation of being very unhealthy ; the shores of the main island are lined in places with mangrove swamps, which uncover at low water, and are productive of malaria and fever. In this respect, as well as in others, Mayotta differs from the other Comoro islands, which are generally considered healthy.

The mean temperature at noon, from January to April, ranges from 84° to 90° ; the period of greatest heat is in January and February, when at times it reaches 93° ; the mean temperature of the year is 77° . The range of the barometer is between 29.7 and 30.0 inches. The rainy season is from November to April.

Winds, Currents, Communication.—See page 465.

Pilots.—There are Government pilots who reside on Pamanzi island, and will generally come off to vessels about to enter by Bandéli passage if the signal is made. For the other passages no pilot can be procured, as they are out of signal distance of Pamanzi.

Vessels must communicate with the authorities before seeking anchorage in other places than Pamanzi bay.

OUTLYING REEFS.—Mayotta is surrounded by a chain of reefs which extend from the main island on the north, north-east, south-east, and south sides between 4 and 5 miles, and on the west side upwards of 8 miles ; besides which, to the north-westward there

is a detached reef about one mile in diameter, with $2\frac{1}{2}$ fathoms water ; its centre lies with the high part of Zamburu, bearing S.E. $\frac{1}{2}$ E., distant nearly 8 miles.

The circle of reefs round Mayotta has about 14 passages through it, most of which are deep enough for all classes of vessels. These reefs, whilst forming spacious sheltered anchorages and secure ports in all directions, are most dangerous to vessels approaching the island without due caution, owing to their great distance from the land, and the uncertain currents which prevail in the vicinity.

The reefs are generally visible by the discolouration of the water, which, when the sea is calm, is in many places the only sign of danger, their outer edges being steep, with no bottom at 50 fathoms close-to. There is, nevertheless, a bank of deep soundings on the west side of the island, extending nearly 2 miles beyond the reefs, where, in case of necessity, vessels being drifted towards the reef might bring up. Inside the reefs the soundings on the eastern side of the island are from 15 to 25 fathoms, and from 25 to 40 on the western side.

ZAMBURU or Saddle island, which is separated by a distance of $2\frac{1}{2}$ miles from the north-west end of Mayotta, is about one mile in diameter and about 1,000 feet in height. The saddle appearance of the top of the island is most conspicuous from the north-east and south-westward.

Anchorages.—There is temporary anchorage eastward of Zamburu in 10 fathoms water, about half a cable from the reef, with the north extreme of the island bearing W. by N., and cape Mohilla S. by W. $\frac{1}{2}$ W.; the reef is steep-to and must be approached with caution, anchoring as soon as the above depth is obtained. There is also temporary anchorage on Prudente bank, 2 miles north-westward of Zamburu, in from 6 to 15 fathoms, sand and coral.

Between Zamburu and the main island are the two Choazil islets, visible about 12 miles.

ZAMBURU PASSAGE.—The approach from the westward, to Zaudzi, in Pamanzi bay, wherein is situated the French Naval and Military establishment, is by Zamburu pass. Its entrance, which is about 17 miles from Zaudzi, lies between Zamburu island and North reef, thence it runs along the north shore of Mayotta.

Bar.—Nearly in mid-channel of the entrance, about $2\frac{1}{2}$ miles, E.N.E. of the highest peak of Zamburu island, is a coral patch of $4\frac{1}{2}$ fathoms, on which the French vessel of war *Cordelia* touched ; the bank on which this patch is situated is stated to be one mile in length, with general depths of 6 fathoms, but H.M.S. *Seagull*, 1881, passed over a patch of $4\frac{1}{2}$ fathoms at about 4 cables E.N.E. of the *Cordelia* patch, on

the leading mark ; and a patch of $4\frac{1}{2}$ fathoms appears to exist north-westward of the Seagull patch. As it is stated that the coral bank is growing fast here, and as it seems probable that a bar extends across from Zamburu to North reef, moderate draught vessels should avoid this portion and enter by Duamuni pass (page 487), situated about 4 miles eastward of Zamburu. Abreast cape Duamuni the two passages join ; thence for about 3 miles southward of the cape, the passage is but 3 cables wide between the shoals, and, unless carefully buoyed, is scarcely available for vessels above 20 feet draught.

Buoyage.—The Zamburu passage, entering from the westward, is marked by cylindrical white buoys on the starboard hand, and chequered black and white buoys on the port hand ; placed to mark the channel edge of the shoals.

White buoys mark the Chaloupe reef ; the extreme of the reefs off cape Duamuni ; the eastern of the two reefs, 8 cables south-eastward of Duamuni reefs ; Coq bank and Prévoyante reef. Chequered buoys mark the south extreme of the north-west part of Great North-East reef ; the patch of less than 6 feet midway between it and Laclocheterie reef, and Laclocheterie reef ; also the west extreme of the southern of the three shoals eastward of point Congo. A red buoy marks apparently a patch of 3 fathoms half a mile south-eastward of Laclocheterie reef.

No dependence must be placed on the buoys maintaining these positions. The shoals are distinctly visible towards low water, which is the best time for entering or leaving.

Directions.—Approaching Mayotta from the north-west, Zamburu island will be easily recognized ; it should be approached on a bearing that will clear the outlying dangers. When from 3 to 4 miles distant from the island, steer to bring the second summit (a conical peak) of Pamanzi island on with the extreme of cape Duamuni, bearing S.E. $\frac{1}{2}$ S., and steer on that mark, which leads over the bar or shallow ground between Zamburu and North reef, probably in not less than $4\frac{1}{2}$ fathoms, until Zamburu peak bears West ; then steer about E. by S., until Congo point is in line with the second summit of Pamanzi, bearing about S.E. by S. (*see* sketch C on plan). Observe, however, that Congo point is not quite the extreme of land as shown in sketch C on the chart ; there is Mokaun point beyond it, ill defined on the chart, which a stranger is apt to mistake for Congo point.

The latter mark, with a little variation, will lead through the channel, between the white, and chequered black and white buoys. In approaching Chaloupe reef, which has a depth of 19 feet, and is

situated on the leading mark, open Pamanzi hill a little off Congo point to pass northward of the buoy marking the reef, then it should be quickly brought on again to pass southward of the chequered buoys. (There is said to be no channel southward of Chaloupe.) Coq bank buoy must be avoided in the same manner; thence the leading mark will lead northward of Prévoyante reef buoy. When Zamburu island peak comes in line with Morne hill (a low hill within cape Duamuni, *see* view D), bearing N.W. by W., astern, keep them so, steering S.E. by E., which will lead between the shoals fronting the shore from Congo point eastward, and the shoals marked by a chequered buoy on the opposite side of the channel. When eastward of Congo point, keep Zamburu peak a little open northward of the hill, to give a wider berth to the shoals fronting the shore. Aombé island, which is steep-to on its west and south sides, may be passed close to, thence pursuing a mid-channel course into Pamanzi bay, or round to the anchorage south-west of Zaudzi. In proceeding to the last mentioned, when rounding Zaudzi spit, marked by a buoy, observe that the four Nossi Effatsi islands open westward of Mouniameri island leads westward of it. *See* Zaudzi town and anchorages, pp. 490–491.*

DUAMUNI, or North-east Passage, is the channel about one mile wide, between North reef and Great North-east reef, and, with the exception of the 5 fathoms patch on the leading mark, about $1\frac{1}{6}$ miles from the summit of cape Duamuni, appears free from danger.

To enter, bring cape Duamuni on with Muruamu-Be mountain, S.S.W. $\frac{1}{4}$ W. (view B on plan), which will lead in between the reefs, and when Zamburu peak bears W. $\frac{1}{2}$ S., steer for it, to avoid the 5 fathoms patch; thence with Congo point on with second summit of Pamanzi, proceed as above directed for the Zamburu passage, page 486.

WESTERN PASSAGES.—Choazil Islands Passage lies southward of Zamburu island; it is apparently half a mile wide between the reefs, with depth of $5\frac{1}{2}$ fathoms; the leading mark is the northern Choazil island on with Morne hill, E. $\frac{1}{4}$ S., thence northward of North Choazil island and cape Duamuni, where it joins the Zamburu.

Great Western Passage, 8 miles southward of Choazil passage, is wide and easy of access. To enter, bring Combani mountain on with Red mount (a hill with a red patch near the sea), E. by S. (view A on plan).

* *See* plan of Pamanzi bay, on chart No. 2741.

If bound to Boéni bay, keep on this leading mark until East point (of the Boéni peninsula) is in line with Uchongui peak, bearing S.S.E.; then steer for this mark until about one mile from East point, then haul into the bay with Caroni island S.E., which course will clear the reef extending off East point.

Boéni Passage, about 7 miles southward of Great Western, lies with Boéni point hill on with the easternmost peak of Mavégani mountain bearing East (view I on plan). This passage is about half a mile in breadth, but its distance from the coast renders Boéni point difficult to distinguish from the other land.

Boat Passage, situated about 3 miles southward of Boéni passage, is probably so called from its being very narrow, but it has deep water. The leading mark is Uchongui mountain, midway between Cani point and Cani hill, bearing E. $\frac{1}{4}$ S. (view K on plan). This passage should not be attempted without a pilot.

SAZILEY PASSAGES, on the South-east side of the island, are three in number, divided from each other by coral flats, the southern of the two flats being crowned by a sand bank, which uncovers at one-third ebb. These passages are not much frequented, but they have deep water.

South Saziley Passage is about one mile wide. To enter, bring a tuft of trees near the south point of the island over Dapani point, bearing W. by N. $\frac{3}{4}$ N. Buni island bearing W. $\frac{3}{4}$ N. will also lead in (see view H on plan).

Middle Saziley Passage lies with the sugar-loaf part of Uchongui mountain just open southward of Morne Carré, about W.N.W. This passage has from 7 to 8 fathoms water (view G on plan).

North Saziley Passage is the narrowest of the three. The leading mark between the reefs is the sugar-loaf part of Uchongui mountain, just open northward of Morne Carré, about W. by N. This mark takes a vessel rather close to the coral reef on the south side of entrance (view F on plan).

BANDELI PASSAGE, on the eastern side of Mayotta, is situated about 5 miles southward of Pamanzi island, and is the usual one for vessels approaching Zaudzi from the eastward.

Landmarks.—Buoys.—A whitewashed obelisk on a spur of Mavégani mountain serves as a distant mark, and leads to the entrance of the pass when bearing W. by N. $\frac{3}{4}$ N.; also a white conical beacon is erected on the cliffs immediately behind White rocks; the two beacons in line leading through the pass, which is

marked by three white buoys on the northern side, and three black and white chequered buoys on the southern side; the outer buoys on either side are conical, with vane; the middle buoys are conical, and the inner buoys cylindrical.

No dependence must be placed on the buoys maintaining their charted position.

Directions.—To enter Bandéli pass, steer in with the white beacon on the spur of the Mavégani, in line with the white beacon over White rock bearing W. by N. $\frac{3}{4}$ N., which will lead close to the outer white buoy; as the mark leads diagonally across the entrance, the back beacon should be kept a little open to the southward of the front one, in the outer part of the passage, and northward of the front one in the inner part of the passage; this will lead a vessel in mid-channel between the buoys (*see* view E on plan). Entering in the morning, when the sun is astern, the reefs will show well. The flood tide sets towards the north side of the channel, and must be guarded against.

When Uchongui peak is open northward of Bandéli island, a vessel will be within the reefs, and may haul northward for the west extreme of the Ajangua islands; pass these islands at the distance of about one cable, and then steer so as to pass eastward of Buzi island, giving the islet off it a berth of one cable. If preferred, a vessel may pass westward of Buzi, but in this case give its south-west end a berth of a quarter of a mile, to avoid an outlying reef, and pass within 2 cables of its north side to avoid the patches of coral which extend southward from Choa point.

Buzi island is about 540 feet high, and wooded near the summit. The rock off its north-east side is covered at high water.

From Buzi island, if bound to the anchorage south of Zaudzi, steer direct for it, avoiding Orestes rock, which lies in the anchorage.

If bound to Pamanzi bay, the anchorage north of Zaudzi, observe that the eastern of the four Nossi Effatsi islets kept touching the west side of Mouniameri island leads eastward of Choa point shoals, and that the same islet kept will open of Mouniameri, leads westward of Zaudzi spit. *See* anchorages pp. 490–491.

Longorori Passage is a narrow cut in the reef, about $3\frac{1}{2}$ miles southward of Pamanzi island; it has plenty of water, but is tortuous, and only fit for boats.

PAMANZI ISLAND is situated about $1\frac{1}{2}$ miles from the eastern side of Mayotta, on the eastern part of the Great North-east reef; it is about $3\frac{1}{2}$ miles long, north and south, and $2\frac{1}{2}$ miles east and west; its

eastern hill, the summit, on which there is a signal station, is 782 feet high, with a flat top ; the conical hill three-quarters of a mile westward of the signal station is named Second summit, and is a leading mark for Zamburu passage. Near the north-east extreme of Pamanzi is Zeānn lake, apparently the centre of an extinct volcano.

PAMANZI BAY, or ZAUDZI ROAD, on the west side of Pamanzi island, and northward of Zaudzi, is sheltered by Pamanzi island and the Great North-east reef, and is a secure anchorage, especially during the south-west monsoon period.

Military Establishment.—Zaudzi island lies to the westward of Pamanzi, and is connected with Mamutzu peninsula by a neck of sand, on which a causeway has been constructed. The French establishment is on this island, and consists of a governor and colonial officers, some artificers and seamen, and about 100 soldiers, besides a few native ones. There are a few substantial government buildings and storehouses, numerous huts, and jetties available for boats at half tide, on the north-east and south-west sides of it.

The semaphore at Zaudzi is in lat. $12^{\circ} 46\frac{3}{4}'$ S., $45^{\circ} 16'$ E. (approx.).

Town.—Mamutzu peninsula is the western extreme of Pamanzi island. The commercial town is situated at the foot of the peninsula, in Pamanzi bay. The governor has a house on the summit of the peninsula, and there is a jetty at its foot.

Lights.—Fixed lights are exhibited from posts on the two jetties at Zaudzi island, and also on the jetty at the foot of Mamutzu peninsula, visible about 2 miles.

Zaudzi Spit extends nearly 4 cables westward of the north end of Zaudzi ; its extreme is usually marked by a conical red buoy in 6 feet water. The four Nossi Effatsi islands open westward of Muniaméri island leads westward of it.

Orestes Rock lies about $1\frac{1}{2}$ cables southward of Zaudzi spit, with Zaudzi west jetty light in line with a lightning conductor on one of the buildings, bearing about East and distant 2 cables. It is a cone of coral not more than 12 yards in diameter at its base, rising to two sharp pinnacles, which are so small that the lead can hardly be placed on them ; one of these pinnacles appears to have a depth of 3 feet only at low water spring tides, with 4 to 5 fathoms all round at 25 yards distance. A white buoy marks the rock.

Anchorages.—There is good anchorage in the north-east monsoon period anywhere southward of Zaudzi spit, avoiding Orestes rock.

A good berth is in 11 fathoms, mud, with the west extreme of Zaudzi N. by E. $\frac{1}{2}$ E., and the south extreme of Pamanzi S.E. by S.

The best anchorage during the southerly monsoon period is in Pamanzi bay, which at that season is smooth. It is clear of danger with the exception of a coral shoal, with 6 feet water, situated about one cable north-eastward of Zaudzi jetty, marked by a white cylindrical buoy. The bottom is foul southward of the buoy. A good berth will be found in 7 fathoms, with North point of Pamanzi bearing N.E. by E., and Second summit of Pamanzi S.E. $\frac{1}{2}$ S.

There is also good anchorage in Longoni bay on the north coast of Mayotta, about 7 miles from Pamanzi bay, in depths of 10 to 20 fathoms. Under Longoni point, the north extreme of the bay, is Longoni cove (*see* plan on chart No. 2741) about 2 cables in length by one in breadth, with depths of 4 to 9 fathoms, mud. Good firewood and water may be obtained here, and fish are plentiful. *Prévoyante* reef, which lies in the approach to Longoni bay, is said to extend farther north-westward than is shown on the chart; it is generally marked by a buoy.*

Tides.—It is high water at Zaudzi, full and change, at 4h. 10m.; springs rise 12 feet; the flood runs southward and the ebb to the northward.

Supplies of poultry, vegetables, and fruits may be obtained at Zaudzi, and cattle are brought from the main island; *see* products mentioned on page 484. A government supply of provisions is kept here for the troops and for the French cruisers on this station. For mail communication, *see* page 465.

There are two wells on Zaudzi, but the water is not good. The establishment is supplied from the main island, where there is an abundance of good water; it is brought over in boats, and stored in a large reservoir on Mamutzu peninsula.

Light draught vessels can beach for repairs abreast the east end of the causeway in Pamanzi bay, buoying the rocks previous to beaching. H.M.S. *Seagull* beached here.

Coal is stored at Zaudzi for the use of French vessels of war, and small quantities can usually be obtained. About 500 tons are usually kept in stock. Coaling is by lighters and very slow, owing to the insufficiency of labour.

Note.—For a description of the islands and dangers eastward of Mayotta, *see* Sailing directions for Islands in the Southern Indian ocean (*about to be published*).

* *See* plan of Longoni bay on chart No. 2,741.



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